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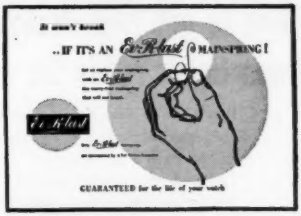

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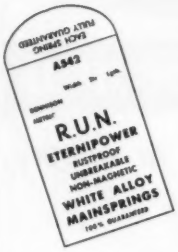

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Some 57 percent of prospective brides either go along to the jeweler's to select a ring, or give the boy friend a very clear idea of what is expected, according to the Summer edition of "Modern Bride" magazine.

For the wedding ring purchase, 70 percent of the little women show up in person. The average bride among the magazine's readers gets a $399 engagement ring—and 65 percent get matching wedding and engagement ring sets.

The young man doesn't always pop the engagement ring along with the question any more.

American HOROLOGIST JEWELER

Reducing Comebacks To a Minimum

Lecture Ten

The Use and Care of Fine Tools

By Samuel Levin

■ SINCE engaging in the manufacture of lathes and miscellaneous watchmakers' tools we have found that the watchmaking field accounts for only a small part of their distribution. This may be a surprising fact to some of you who have not had the occasion to come in contact with users outside your own field of work.

You will recall that during the war, and since, there has been quite a demand for skilled watchmakers in the manufacture and servicing of various types of instruments. With the growth of the electronics industry and the instrument industry, which are today an important part of our economy, the demand for men skilled in micro-machining techniques has been increasing.

During the period of the greatest labor shortage almost any watchmaker could obtain a job in industry. Today, however, most firms are more discriminating and in many cases would rather hire someone with absolutely no experience and train him on the job. It may be somewhat disillusioning to learn that although watch repairing is considered a highly skilled craft, the average workman's skill consists largely of his ability to handle delicate parts and very little in his familiarity with measuring and machining processes.

Let me elaborate this point a little. Very few watchmakers possess any measuring equipment beyond a simple micrometer. Yet, without too much difficulty one can think of numerous applications for an ordinary test indicator or dial indicator which every machinist uses. In my own experience in hiring watchmakers I have found many who have never heard of a slide rest and had no conception of how to sharpen a cutting tool, including the simple hand graver. And there is among them very little knowledge of the proper speeds and feeds for cutting various materials.

It is not at all unusual for a watchmaker to break the point on a carbide graver the first time he uses it, and then return it to the jobber claiming it is soft or otherwise defective. He does not realize that tungsten carbide is a chemical substance with an intrinsic hardness next only to a diamond, and that is just cannot be "soft." The trouble, of course, is that carbides are brittle and require special care.

Just the other day a watchmaker complained that a high speed steel saw was soft because it wore out after trimming a single stainless steel bracelet end. He thought that because the saw was made of "high speed" steel it could be run at the fastest speed his lathe would run. As you can well imagine, all the teeth in the saw were nicely rounded on the tips. I doubt if it could even cut a finger at high speed.

Now, I do not wish to leave the impression that watchmaking is not deserving of the respect accorded to it. But, sometimes a little self criticism and comparisons with other professions is healthy.

Some of you, I am sure, will recall the old time auto repair shop, which in many cases was only a modification of a blacksmith's shop. Compare this to the present day repair shop where all the equipment is spick and span, where every wrench has its individual place on a shining rack, where every piece of equipment is designed for convenient and speedy operation. Even the lubricating equipment has developed over the years from a simple oil can to highly complex and ingenious grease guns. If your car needs attention and you have your choice of several shops, you will invariably choose the one with the most elaborate equipment and the most

efficient appearance. Of course, this does not by any means guarantee the best work. However, there is a lesson to be learned from this.

The average person, and this includes me and every one of you here, respects the knowledge and efficiency which is represented by a complex array of tools and the neatness of appearance. It makes no difference whether we are buying a repair job or a new car, or a new house. We are all guided largely by appearances. Now just suppose that you gentlemen are not watchmakers, but that you are customers coming into your own places of business to have watches repaired. What will be your impression when you look at your own equipment as a customer sees it? Do you treat your own lathe and other tools with the same care as you expect from your customers toward fine watches?

I would like to speak about the care of tools at this point for a few moments, for it is my opinion that if one takes the proper care of his equipment his work will be better and more profitable. Let us begin by considering a lathe, which is generally regarded as a watchmaker's most important tool.

Dirt Can Ruin Lathe

When a lathe is assembled at the factory it is not just a mass produced piece of crude machinery which can be assembled by anyone at all. Each head stock and tail stock is hand fitted to the bed on which they are used. Only in this way can an accurate alignment between the head stock and tail stock be obtained and, in a fine lathe, the alignment error can be measured in tenths of a thousandth of an inch. Suppose that a particle of dirt happens to be under the tail stock when it is clamped to the bed. The spindles can be thrown out of alignment an amount which is three or four times the size of that particle. Furthermore, the bed and under side of the tail stock may then become burred, causing a permanent error unless the burr is removed. Often, the burr cannot be removed without cutting through the plating. Therefore, the first thing of importance in the care of a lathe is to keep it clean. Always wipe off the bed and the underside of any accessory before clamping it to the bed.

Sam Levin, the author of this article, is the "Son" in Louis Levin & Son, Inc., noted toolmakers, and is considered a likely equal to his father's brilliance in mathematics and engineering. Both men are held in high regard by the profession, and offer their assistance on any occasion to be helpful to the watchmaker.

Let us now consider the tail stock spindle. Here is a finely finished spindle which is lapped to a precise fit, and because it has a bearing surface throughout its length, it is never plated. What happens to it when acid bearing fingerprints are not removed in time? Why, it becomes rusty, as we know all too well. As you all know from your experience with watches, it is impossible to remove the rust without removing the surface layer of metal to depth equal to the depth of the erosion due to rusting. The moment this is done the dimensions of the spindle are altered and the accuracy is destroyed.

These observations on rust apply equally well to the head stock spindle, and all unplated parts. The chuck seat in a good lathe spindle is finished so accurately that a test indicator will show less than one ten thousandth of an inch runout. This precision can be preserved only if the chuck seat is kept clean and free from rust. This means that, before a chuck is inserted in a spindle, both the spindle and the chuck should be wiped clean.

Most of you have lathes with cone bearings, for it is only within recent years that ball bearings have been applied to watchmakers' lathes. Periodically, it is necessary to take up the play in cone bearings. Every cone bearing lathe is provided with a nut, generally split, for this purpose. To adjust the bearings, simply tighten the nut until the spindle drags, and then back it up to the point where the spindle revolves freely but without end play. It may

seem to you that this is so elementary that everyone should know how to do it. However, I have seen more than one lathe shipped 3,000 miles to the factory and nothing was required except a slight adjustment of the nut to take up play which had occurred over a period of time.

The spindle bearings of a cone bearing lathe should be oiled periodically with a light spindle oil such as a sewing machine oil. The frequency, of course, depends on how much the lathe is used. Occasionally, a cone bearing head stock should be taken apart and cleaned. When this is done be sure that the pulley set screw is in alignment with the hole in the spindle, or the pulley will not hold properly and the spindle may be marred by the point of the screw.

If you have a ball bearing lathe it is best to follow the manufacturer's recommendations with respect to lubrication. Most lathes of this type have grease sealed bearings which should never be oiled.

Next to the lathe itself, the most important accessories are the chucks. A high grade chuck is made of tool steel and has a precisely finished hole. However, the chuck will hold work accurately only when the work is perfectly round and when it corresponds in size to the size of the chuck. While a chuck will spring enough to permit the insertion of work differing slightly in size, it will not stand very much of a difference. For one thing, if there is a considerable difference, the work will not run true and it cannot be gripped securely. Also, the chuck may be permanently deformed and cannot be relied upon thereafter to hold work true.

For many years it has been the custom for a watchmaker to buy a lathe with a 10 chuck combination. Of these ten chucks, two are the taper chuck and screw chuck so that he actually has only eight wire chucks in the set. How much can a man make of eight chucks when it takes 89 sizes to cover the complete range within the capacity of the lathe? The man who restricts himself to 10 or 15 chucks arbitrarily limits the usefulness of his lathe, and may never have the opportunity to learn what can be done with it.

The method employed to drive a lathe is also a subject of considerable importance. The most inexpensive, but also the least desirable arrangement for driving a lathe is to belt it direct to a small universal motor. The objections to such an arrangement are serious and the only thing that can be said in its favor is that it is comparatively low in cost. The usual 1/10 H.P. universal motor develops its full power only at top speed, which is generally about 7,500 r.p.m. The power developed is approximately proportional to the speed. If one uses such a motor when turning away the hub of a balance staff, it is necessary to use a motor speed of about 1,500 r.p.m. This is a reduction in speed of five to one. The available power is likewise reduced five times, and instead of having a 1/10 H.P. motor we actually have a 1/50 H.P. motor. This is barely enough to overcome the bearing friction and drag of the brushes, and leaves no reserve for doing useful work. If the motor is operated at a reduced speed for any length of time it is tiring to hold the foot in an unrelaxed position on the pedal of the rheostat, and unless the rheostat is designed for continuous use it may burn out. The obvious and simple solution to this problem is to the use of countershaft driven by an alternating current motor and make the speed changes by shifting the belt on the cone pulleys.

Importance of Lathe Speeds

What speeds are actually required for different operations? Well, before one can begin to answer such a question it is necessary to consider the materials with which we have to work. A glance at just one steel company's catalog shows 50 different types of steels. The SAE specifications for steel list over 200 different compositions for steel of all types, cold finished, hot rolled, carbon steel, oil hardening, air hardening, carburizing, alloy steel, stainless steel and others. We find one company listing 33 grades of brass and 71 grades of bronze, as well

as numerous grades of copper and nickel silver alloys. And there are over 20 types of aluminum alloys on the market.

Let us consider just the operation of turning for a moment. A leaded screw stock steel, for example, can be run at a surface speed as high as 300 feet per minute. On the other hand a high carbon tool steel like drill rod is generally run at no more than 70 feet per minute, and certain stainless steels are run at even slower speeds than this. Brass and aluminum can be run much faster. The maximum speeds and maximum cutter life can be obtained only when the tools are sharpened properly and a suitable coolant is used.

The watchmaker almost never does turning under ideal conditions and, therefore, must reduce his lathe speeds and expect a shorter cutter life. Now, how can one get information about the proper speeds for these various materials? There is almost no published material pertaining specifically to the watchmaker's problems. However, there is a great deal of information which can be had from the catalogs of steel manufacturers and from such books as "Machinery's Handbook." All this data, however, is nothing more than a guide. The final answers are obtained only from actual experience.

There was once a time when it was a simple matter to choose a piece of steel and to harden and temper it. With the specialization brought about by the complexities of present day manufacturing, it is necessary for a mechanic to be well informed.

The theory of cutting tools has also been the subject of much study in recent years. The introduction of carbides and the pressures of war production provided some of the stimulus. Most of the turning done by a watchmaker is performed with a hand graver. The only reason for using a hand graver is the sensitive control which can be obtained this way. The maintenance of size and smoothness of finish is completely dependent upon the manual skill of the workman. While a hand graver may be used satisfactorily for turning a balance staff, for chamfering and for short cuts, it is not suitable for heavy cuts or long surfaces where dimensional accuracy is important. When such work is to be done, a slide rest is essential.

Whether a hand graver is used, or whether the turning is done with a slide rest, certain fundamental principles must be observed. The edge of any cutting tool is wedge or chisel shaped, and is forced into the work as it revolves. The exact shape, however, has a great deal to do with the smoothness of the work and the efficiency with which it is performed. It is necessary to make the tool with the proper rake and proper clearance for the type of material being turned. Again I refer you to the standard machinists books for details of cutting tools.

When I started to learn watchmaking many years ago, one of my first lessons was to learn how to sharpen a graver on a flat oilstone by rubbing it back and forth. I had to keep on rubbing down gravers until I could get a symmetrical shape and a flat surface. I finally learned how to do this and I must admit that it takes a little skill to do it. However, it was not long after that I had the pleasure of doing the same job about 50 times faster on a wet grinder.

Sharpening a graver without a grinder is almost a complete waste of time. The price of a small bench grinder with a six-inch wheel will be quickly recovered in the time saved. If high speed steel gravers are used instead of carbon steel there is yet a further advantage, for the danger of drawing the temper by overheating is practically eliminated.

The sharpening of small pivot drills can be done in a jiffy on a diamond lap. The grain of a grinding wheel, even one as fine as an Arkansas oilstone, is so coarse that it may break off a fine drill the moment it is touched to it. Incidentally there is a tremendous amount of small hole drilling being done in the instrument field and for deep hole drilling one can get twist drills as small as .15 of a millimeter.

Required Accessories

As the needs of the instrument industry are being met, so will the watchmaker have a greater variety of tools available.

To mention an example, until recently there were no small milling cutters available. One either had to make such cutters himself or have them made to order at great expense by one of the cutter manufacturers. Today there are a number of standard end mills in various styles which can be purchased in sizes as small as .060 of an inch. Reamers can be had in all sizes down to .040 of an inch or one millimeter.

As to the other accessories for the lathe and the many hand tools available for watchmaking, there is a great deal to be said. It is, of course, difficult to talk about the advantages of using particular pieces of equipment to one who is not familiar with them. For the appreciation of the application of a tool comes with actual experience or from a practical demonstration. Here is where it becomes a responsibility of schools to teach their students the uses of tools. It is regrettable that after so many years of trade association activity we still do not have a single school in the country offering a course at the university level to train teachers of watchmaking and other subjects involving fine mechanics. This is your problem as an association. Indirectly most of the economic problems of your profession are related to the standards maintained in it.

As a manufacturer of equipment I have a selfish interest in seeing that the highest possible standards pertain in the watchmaking field. For the higher the level of education and the greater the variety of work performed, the more tools we can expect to sell. No matter how selfish the motive, however, no manufacturer can lose sight of the fact that, in order to sell, a tool must earn its cost and more in time saved and effort conserved.

As laudable as your goals may be however, they can be attained only by the collective effort of all the members of your profession and by the members of your organization in particular. So far as the manufacturers of your tools are concerned, they will, I am sure, continue to cooperate with you to the fullest.

Next month, Mr. Louis Hayman of E. W. Reynolds Co. will offer "Suggestions on How to Order Watch Material."

22nd Annual Convention

United Horological Association of America

April 23-25, 1955 **Omaha, Nebr.**

MERCHANDISING and sales promotion comprised the keynote of the 22nd annual convention of the United Horological Association of America, held in Omaha, Nebraska, April 23-25.

Standing-room-only audiences responded to the talks given by the featured speakers. In an address entitled "Four Steps for the Future," Don Belding of Los Angeles, chairman of the executive committee of Foote, Cone & Belding, delivered some hard-hitting points designed to increase both sales and dignity for the jeweler. A prolonged ovation rewarded Mr. Belding's efforts.

Paul A. Tschudin, director of the Watchmakers of Switzerland Information Center, also received a hearty response for his talk on the watchmaker as a profitmaker to the jewelry store. Mr. Tschudin pointed out the many new opportunities evident in the jewelry field, and cited the need for intelligent and unremitting promotion in addition to superior service. He promised full cooperation from his organization in experimenting with new ideas and techniques to build business for watchmaker-jewelers.

Gene Sobel, president of the Watch Material Distributors Association of America, probed at the heart of a "chaotic situation" in the industry—materials ordering. He pledged WMDAA's complete cooperation, service and courtesy to a reciprocity program. A joint UHAA-WMDAA committee was authorized to establish a standard system.

Other speakers' subjects dealt with the need for developing paramount skills, and the right to charge commensurately for improved services.

The UHAA Distinguished Achievement Award was presented to Henry B. Fried of New York City, J. E. Coleman of Nashville, Tenn., and G. A. Berner of Bienne, Switzerland. Mr. Coleman accepted his award personally, while Leonard Oppenheimer of the New York Horological Society accepted for Mr. Fried. Paul Tschudin accepted for Mr. Berner, who wished a prosperous future for American watchmakers.

Convention resolutions included: That pin-lever watches be identified as such on the dial (so that plainly visible when cased) in order to protect the integrity of the jeweled lever watch industry and the interests of the American people; commendation to the program and entertainment committees for an exceptionally well organized convention; appreciation to the Elgin National Watch Co. for warm hospitality accorded during a tour of the Lincoln plant; appreciation to the Watchmakers of Switzerland for educational efforts toward both watchmakers and buying public; appreciation to WMDAA for outstanding cooperation; and appreciation to advertisers who contributed to the success of the convention.

Norman D. Luth of Bell, Calif., was re-elected president of UHAA, William J. Yost of Milford, Nebr., elected vice president, and Orville R. Hagans of Denver, Colo., re-elected executive secretary. Board members elected were Milton E. Roth of Waterloo, Iowa; Irl Bradberry of Clinton, Ky.; Max C. Phillips of Twin Falls, Idaho; and J. E. Coleman of Nashville, Tenn. Regional directors are John DeVogel of Albany, N. Y.; Leslie E. Dewey of Minneapolis, Minn.; James A. Long of Winston-Salem, N. C., and G. Y. Swartzendruber of Cedar Rapids, Iowa.

Sioux City, Iowa, was selected as the site for the UHAA 1956 convention.

U.H.A.A. officers: Standing, left to right, Director Irl Bradberry of Clinton, Ky.; Vice President William J. Yost of Milford, Nebr.; Director Milton E. Roth of Waterloo, Iowa; Director J. E. Coleman of Nashville, Tenn.; Director Max C. Phillips of Twin Falls, Idaho. Front: President Norman D. Luth of Bell, Calif., and Executive Secretary Orville R. Hagans of Denver, Colo.

Principal address of the convention was delivered by Don Belding, chairman of the executive committee of Foote, Cone & Belding.

Delegates toured the Lincoln, Nebr., plant of the Elgin National Watch Co. in one of the most interesting highlights of the convention.

J. E. Coleman is presented Distinguished Achievement Award by Orville R. Hagans

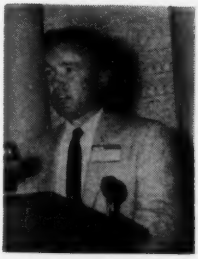
Award to G. A. Berner is accepted by Paul Tschudin

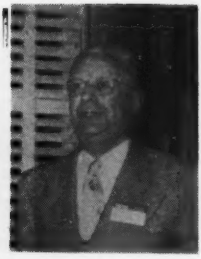
Award to Henry B. Fried is accepted by Leonard Oppenheimer

Public display at the Hotel Fontenelle of U.H.A.A. Annual Workmanship Contest entries drew considerable interest.

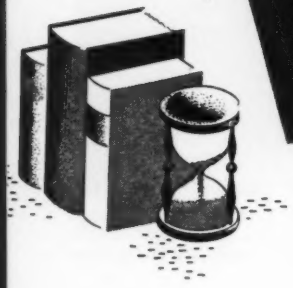
Don Belding, Paul Tschudin and Orville R. Hagans view the set-up of the exhibit "Evolution of Time" prepared for public display.

Judged first prize winner in the Workmanship Contest was this desk clock constructed by Bruce Blackman of Inglewood, Calif. Of unusual design, the clock incorporates a detent escapement.





Included among the chief speakers at the convention were the following: Top left, Paul A. Tschudin, director of the Watchmakers of Switzerland Information Center; top center, Eugene Sobel, president of the Watch Material Distributors Assn.; top right, James L. Hamilton, chairman of the UHAA technical advisory board; lower left, Don McLane, president of the Horological Assn. of Nebraska; lower right, L. Lockwood, president of the Nebraska Retail Jewelers Assn.



information PLEASE!

Various Methods Used In Overcoming Stubbornly Magnetized Watches

JPW: I have a 1080 Eta watch that was magnetized and I have two demagnetizers of my own, with which I tried to demagnetize the movements and was successful in doing so (all parts) except the hairspring, so I have tried in every way to demagnetize the spring, first by inserting the whole movement but with no success, then I removed the spring from the balance placing it between cardboard, inserting the spring only in the demagnetizers. It still remained highly magnetized to the extent of making the needle spin around. The balance is a solid one and it is nonmagnetic as I tried it over compass needle and the needle was not affected. Also all steel parts as ratchet wheel, crown wheel, set bridge did not show any trace of magnetism. I boiled the hairspring in olive oil, which did not have any effect on it.

I have successfully demagnetized thousands of watches, but this one has me whipped. However, some are much harder to correct than others. I know the solution would be easy by vibrating a new spring, but I would greatly appreciate your version why this particular spring cannot be demagnetized.

INFORMATION PLEASE

Directed by
W. H. SAMELIUS

Chairman, Science of Horology and Technical Advisory Board

Answer: This column receives many requests for a solution or explanation as to what to do when one runs up against a stubborn or obstinate job such as you have. Some time ago the New York Horological Society held a meeting devoted to magnetism, and the following quotations are taken from lectures delivered by such well-known and prominent horologists as Dr. Rawlings, Paul Zwillinger, Herman Slobin, and Austin Henry. I am taking the liberty to quote parts of their lectures.

Though we are properly proud of our advance in scientific knowledge, in nuclear physics, in medicine and other branches, what we don't know is still vastly greater than what we know. This is particularly true in the case of magnetism.

If we say a magnet attracts a piece of iron we also mean that the iron attracts the magnet. For this reason, the watchmaker's use of a small magnetic compass to test the magnetization of a watch seems of doubtful value. Unmagnetized iron will attract a compass needle, so the needle may be expected to quiver if placed just above a steel balance with no permanent magnetism. One reason is that the magnetic needle itself magnetizes the balance, temporarily, and not very strongly, but enough to cause a quiver. Therefore, it would seem advisable to use a "compass" with an unmagnetized needle for this test. If this quivers, it can only be from magnetism in the watch.

A demagnetizing coil fed with alternating current generally gives good results if the

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watch is passed slowly through it several times in different positions. It is also possible to demagnetize by hanging the watch on a loop of string and letting it twirl while a strong magnet is brought close to it and then slowly withdrawn.

With the advent of non-magnetic balances and hairsprings, demagnetization is not so often called for.

That raises the question of how can the watchmaker tell whether a watch part influences the compass because it is steel, or because it is magnetized. There are few absolute answers to many problems involving magnetism, because, as Dr. Rawlings pointed out, too much about the subject is unknown. But, within reasonable limits, guiding rules can be given on this point.

When a piece of steel has become permanently magnetized, it has become a magnet. Every magnet must have two or more poles, otherwise it is not a magnet, and hence the piece has not become magnetized, even if it does influence the compass needle to some extent. Now, if the piece has two or more poles, at least one of them must be N and at least one other must be S. Hence, it must be possible to get not merely a displacement of the compass needle, but a definite or near 180° reversal of the needle, when the compass is moved around the piece or vice-versa.

It is also true that now and then a "non-magnetic" hairspring turns up which has become permanently magnetized. These instances are the exceptions. They are infrequent and are probably due to uncontrollable flukes in individual alloying batches or in manufacturing processes. They need not be thrown away. With a strong enough demagnetizing system it should be possible to demagnetize them. However the chances are that after that, they will be no better than an ordinary steel hairspring.

The biggest problem in removing magnetism is that none of the commercial demagnetizers are strong enough. In order to obtain a coil of sufficient magnetic field to take the magnetism out of a very hard piece of steel it is necessary to make the coil out of larger wire and more turns, making the coil considerably more expensive and of course larger. Another speaker who spoke on this problem suggested using a step-up transformer. This expedient has some danger connected with it. This method was to increase the voltage applied to the coil the watchmaker now has. This will cause rapid heating of the coil, and if the switch is kept closed more than a few seconds at a time the coil may burn up. This method is a solution but should be used with caution and understanding. It is wise to close the switch of the coil before the watch is placed in the coil and then the watch should be withdrawn from the coil until it is safely out of the influence of the magnetic field which is certainly more than two feet. Great caution must be used that the circuit to the coil is not opened during the entire process of inserting and withdrawing the watch from the coil. A watch can be strongly magnetized by placing it in the coil and closing the switch for an instant.

Lathe Can Become Magnet

A lathe, if in a parallel position with the earth's magnetic field will become a highly powerful magnet in itself. Care should be taken that it is not left in the north-south position. Check for magnetism by moving a compass along its length. A 180° reversal of the needle indicates magnetism.

In stubborn cases of magnetism I have removed the hairspring from the balance, placed it in a receptacle containing heavy oil and put it through the demagnetizer. Since the oil prevents the coils from contacting, this always effectively removes the magnetism.

One more word about non-magnetic hairsprings. That terms means only that the spring cannot become permanently magnetized. But under the influence of magnetic force, most will respond in the same way as an unmagnetized ordinary steel hairspring. Also, if the spring gets in line with the earth's magnetic field it may, during the instant, behave like a magnetized steel hairspring, and may then react not only to magnetic attraction but also to repulsion.

Demagnetizing a magnetized escape wheel

may present a problem in many instances. The wheel has to be removed and fed individually into the demagnetizer. Some watchmakers feel the wheel should be held in tweezers horizontally. Others say it should be held in a pin vise vertically. The direction of the demagnetizer's flux lines, and the angle at which they cut the wheel underly these personal preferences.

If it becomes difficult to demagnetize the wheel, sufficiently and the method of operation is correct, then the demagnetizer should be suspected. It is probably under-powered. It is obvious that a watch becomes magnetized by being exposed to the flux lines of a magnetic field. Now if that flux is strong enough to magnetize the wheel then it seems logical that another flux of continuously reversing nature (AC) and of equal strength can demagnetize the same wheel. This means that if the first force is able to magnetize the part in the case, then the second force of equal value should be able to demagnetize the same part in the same case. That raises the question, is the average demagnetizer strong enough? The answer would seem to be that quite often it is not strong enough.

For so long as presently available demagnetizers must be used, it may be desirable in the event of stubborn situations to employ a set-up voltage transformer and also a voltage control, the latter having a continuously and uniformly variable range from maximum current to zero. The voltage control will be of great help to those that fear that their method of removal from the coil may be faulty. In practice, the voltage control is set to "zero current" and plugged into the wall outlet. The step-up transformer is plugged into the control and the demagnetizer is plugged into the transformer. The part or watch to be demagnetized is held in proper position inside the demagnetizer coil and is kept there. Then the control knob is turned evenly from zero current to full current, taking about one and one-half seconds for this, and then the knob is returned evenly to zero current, taking about three seconds for this. After that, the watch or part may be removed from the demagnetizer.

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Burned Watch—Repair or Not?

WWB: A lady brought in her wrist watch which she had dropped into the flame of an oil burner. She removed it as soon as possible, but evidently not before it got very hot, as the mainspring is set, and all the pivots and pinion leaves are blued. What can I use to remove the discoloration? What do you suggest I do with the watch, or do you think it is probably beyond repair?

Answer: To answer your question would be for you to decide whether it would pay to repair the watch. At any rate, it will take considerable time to restore it to running order. Replacing the mainspring would not cost much, but how about the hairspring? Chances are that the heat has taken out its temper and ruined it; then how about the pallets and roller jewel? No doubt they will have to be re-set (and a great deal depends on how badly the steel work has been burned or heated, and too soft to be of use) as will the click and click spring, and clutch pinion and winding wheel.

These are some of the reasons I cannot advise you what to do. If your customer values the watch as a keepsake, perhaps she would be willing to pay any price to have it restored, and then it may be much cheaper to secure the material rather than try to refinish the burned parts. To remove the blue color from steel, you can use 15 parts sulphuric acid and 85 parts water.

Correcting Automatic Bridle

The following is a letter from Fred A. Smith, watch and clock repairman of Kirkland, Washington:

The letter of HGW and your answer in the February issue interested me much. Some time ago I had a similar experience, and possibly my experience would be of interest to HGW.

One of my patrons had a Swiss automatic given to him which had been purchased from a mail order house. It gained time, so he sent it back to the mail order company for regulation. Two or three such trips failed to get results. The user is a carpenter. They finally agreed to have him take it to a local watchmaker and send them the bill. When he gave me this history, I checked the watch on my timing machine. It printed an unusually good record as to positions, and was "right-on" for mean time. After some experimenting, I found that after winding it manually, it would gain excess motion and re-bank. Opening it, I found the bridle (separate piece from the mainspring) had been installed with the lug-end next to the barrel and the trailing end over it. This caused the bridle to dig into the barrel and not slip easily when fully wound or overwound. It had roughened the barrel by digging in. Polishing the inside of the barrel and reassembling with the lug-end of the bridle bearing on the other instead of the barrel, together with lubrication, proved enough to make it keep good time.

Government Publications

Mr. Earl E. Stacy of Washington, D. C., supplies the following information which may be helpful to many of our readers:

Dear Mr. Samelius:

In the August issue, S.T.P. was asking about a message center clock. He can find this information in the United States Government Printing Office, Washington 25, D. C., publication, "Ordnance Maintenance: Wrist Watches, Pocket Watches and Clocks; Technical Manual 9-1575." Catalog No. 1.35:9-1575. Price 50 cents. I believe this to be a good book for watchmaker students as it shows detail disassembly and assembly of a number of watches such as Hamilton 16 size, 21 jewel, model 992B; Elgin 8/0 wrist watch, model 1783; Bulova model 10AK, plus a great deal of information on repairing.

Two other books on sale for those interested in chronometers: "Manual For Overhaul, Repair and Handling of Hamilton Ship Chronometer with parts catalog." Catalog No. M210.6:C 46/2. Price 50 cents. "Manual For Overhaul, Repair and Handling of Hamilton 35-size Chronometer Watch with parts catalog." Catalog No. M210.6:C 46. Price 40 cents.

The above are well illustrated and show the overhaul of the instruments as practiced by repair depots doing this type of work. I believe they are well worth having on hand if you intend to do any work of this type.

'Jim-Jam' Ansonia

JJR: I have an Ansonia ball swing clock which has given me "jim-jams." It had three wide springs in the cross piece which would not work, so I took these out and substituted four cross springs narrower and weaker. The clock then ran, but I could not get it to go fast enough. I screwed the pendulum down as far as it would go, but it would still lose a half-hour per day.

I then changed to stronger springs, but after winding full in a little while it would run away. The swinging stops, but the little pendulum inside keeps ticking at a fast rate until run down. I set the escapement as close as possible. Where is my trouble? I have a clock of my own, and used four springs from a 4/0 Elgin watch, and it works perfectly.

Answer: May I suggest you replace with a weaker suspension spring, and as this is a compound pendulum, you must raise the lower bob to make the clock so slower.

Watch Has Stubborn Aroma

LAH: Occasionally one runs across a watch that has either been stored in a drawer in close proximity to perfume, or has been worn by a lady who uses cologne on her wrists. Since the odor of the perfume tends to contaminate oil, how can this odor be removed?

I have a watch in for repair now that is heavily scented with perfume. I have used the usual cleaning methods—soaking in naphtha, brushing thoroughly and pegging the holes, then putting it through the cleaning machine. The case I polished and washed in a solution of Tide, stronger ammonia and water, dipped in alcohol and dried. The dial (the watch is a 12-size Illinois) I am undecided about. Is there an approved method of removing such odors from watches?

Answer: Your writer is experiencing the first question pertaining to such information as you seek, so cannot speak from experience. However, I should think after the treatment of cleaning there should be very little perfume left, and perhaps if the watch is exposed with the case open, allowing air to circulate and withdraw what vapors are still existing, they should soon be dissipated. Perhaps some of our readers may have had similar experiences and will let us hear what they did in a case of this kind.

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Telling Time on 24-Hour Dial

SW: Can you please explain to me how to tell time on a 24-hour dial?

Answer: To read a 24-hour dial, the first 12 hours are read as we know to do, but instead of beginning again and saying 1:00 o'clock, and so on, we read the 24 dial by continuing from 12:00 o'clock until we reach 24:00 o'clock, or complete one day of 24 hours. Nowadays, many uses for the 24-hour dial are in use, such as for time table programs, military orders, astronomical dates, etc.

The new watch system will therefore prevent any misunderstanding between A.M. and P.M. On some dials, the night hours are shown on a dark background with luminous numerals, and are well differentiated. It will be very useful in the transports (railway shipping), for postal employees, airway officers, and in factories working with several shifts.

The 24-hour watch belongs to the future, as it is being introduced quite extensively. We shall very easily get used to meeting engagements at 15:00 o'clock instead of 3:00 P.M., or a theater party at 20:15 instead of 8:15 P.M.

Escapement Inventors

A.K.P.: Will you tell who made the first lever escapement, and also the first cylinder escapement?

Answer: Thomas Mudge was born at Exeter, England, in 1715. He served his watchmaking apprenticeship under Honest George Graham, a famous English watchmaker. After Graham's death in 1751, Thomas Mudge started a business of his own in Fleet Street, London.

He invented the detached lever escapement which he introduced in his famous Queen Charlotte watch around 1757. Mudge's detached lever escapement in principle is used today in all lever watches. Mudge was the first to introduce jewel pallet stones and roller jewels into watches. He contributed to perfecting the marine chronometer. He was watchmaker to the court of King George III, and he died in 1794. Thomas Tompion, born in 1638, died in 1713, was the son of an English blacksmith, and became a prominent watchmaker. He was known as "The Father of English Watchmaking." He patented jointly with Booth and Houghton the cylinder escapement. He was buried in Westminster Abbey.

Determining Mainspring Pull

JJ: Is there any way to determine how much push on the pallet amounts to with the mainspring full wound, and after running for 24 hours?

Answer: The only way is to wind a mainspring which is hooked against a steel spring scale, and see what the pull in various positions amounts to; then calculate the reduction by the increase in motion. This was done by a Swiss professor who found that in the watch under test, the mainspring when fully wound exerted a force of 4 ozs. which divided by 18,000 plus train friction gave the pallets a force of about 3 grains. Of course, this should be be assumed as a constant—it was merely the result of testing a single watch, and it would vary with the thickness, length and width of every spring, and also with

Setting a Calendar Clock

RHS: Will you kindly furnish me directions on setting the calendar on a calendar clock? Time is the top dial and the lower dial and date, month and day. I seem to have trouble getting it to change correctly. Is it true that calendar movements should not be oiled? It is an old Ithaca clock.

Answer: To set your calendar clock, turn the center arbor until calendar drops, or changes for date of month, then put the hands on 12 o'clock, which will be midnight; then turn the hands to the hour of the day, and then the calendar will change date at midnight again. The calendar mechanism does not require oil.

Meaning of 'Adjusted'

P.C.D.: How much can I depend on the grade or quality of a watch when the plate is marked "adjusted?" First, what does adjusted mean?

Answer: Adjusted means to bring to a true relative position, as the parts of an instrument. To regulate for use.

Types of Clock Woods

H.C.: Of what wood were the grandfather clocks made? I mean the wheels, pinions and plates. Were there clocks made entirely by hand or was there some kind of machinery used in cutting the wheels and pinions?

Answer: For the wheels of such clocks, cherry was the favorite wood. For pinions, apple and pear tree wood was used. The plates were mostly of quarter oak. We do not think any wooden clocks were ever manufactured entirely by hand; all the manufacturers of wooden clocks had machinery, and some of it was eminently ingenious.

The idea of cutting "nests" of wheels, that is, to string a number of wheels on an arbor and cut twenty or thirty at one time, originated with the wooden clock proper. It is also claimed that the idea of the wood-planing machine was derived from a machine used by the wooden-clock makers. In fact, the wooden clock industry from 1818 to 1840 was very prosperous, but the introduction of the shelf brass clock soon drove the wooden clock from the market.

Oiling Patek-Philippe winder

S. A. B.: I recently had a new model Patek-Philippe automatic in for cleaning, which I did, and it is giving good service. As this watch was new to me, I am wondering if there are any special rules for oiling the winding unit?

Answer: Watch oil is used for the bearings of both clicks and clock oil for the ballrace, the pivots of the cam and pivots of the wheels. Apply a little grease to the sides of the fork embracing the cam.

Testing silver

A. P. S.: Quite often some customer brings in an old piece of silver merchandise wishing to sell it for cash, or trade it in on some new article. I would appreciate it if you will give me a good method of testing silver.

Answer: Apply a drop of chromic acid and after a few seconds wash the acid off with water. If the metal is silver, the acid will leave a red spot—the purer the silver the brighter the red spot will be.

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Westminster Verse

CP: Some time ago I repaired a ¼-chime clock that played the Westminster carillon. Now the owner asked me for the verse that goes with the chime. What am I to tell the owner, as I have not heard of any verse or words to accompany the tune. If there is a verse I would appreciate hearing from you.

Answer: The verse for the Westminster Chime:

Lord, through this hour
Be thou our guide
So by Thy power
No foot shall slide.

Quoted from reference notes.

It is generally accepted that this carillon was composed by Dr. Randall, professor of music, and that he conceived the idea from the fifth bar of the opening of Handel's symphony, *I Know That My Redeemer Liveth.* However there are others who believe this carillon was composed by a Mr. Crotch, pupil of Dr. Randall. Westminster chimes were first fitted into the tower clock at the University church, St. Mary's the Great in Cambridge, and were long celebrated for their simple harmony. They were later reproduced on a large scale in the Victoria tower clock of the House of Parliament in London, England.

Receiving and Discharge

GH: My question is in the pallets and escape wheel. I do not understand what is meant by the receiving jewel and the discharge jewel, and what is meant by the action of the escape wheel tooth to have forward divergence or backward divergence. Also will a clock with a dead beat escapement and weight-driven keep better time than an electric clock? Will the electricity in a body affect the running of a watch?

Answer: The outside pallet stone is the one that the escape wheel tooth comes to rest on first and is known as the receiving pallet, or sometimes called the entering pallet. Then the pallet that the tooth next strikes or is arrested by is known as the discharge pallet, or the one that allows the wheel tooth to travel without further interference is also known as the exit pallet. The forward divergence of the escape wheel occurs after the tooth has dropped onto the locking face of the pallet stone. Due to the position and angle of stone the tooth will draw the pallet stone down, known as the draft, and at that time the wheel tooth will have a forward motion or divergence. Then as the escapement is unlocked the escape wheel will have slight backward divergence as the pallet stone is drawn out to unlock the escapement and allow the tooth to advance giving impulse to balance.

The electric clock today is not a better timepiece than the master clock or governor that regulates the cycles at the Distributing Station. A weight-driven clock with a well made dead beat escapement can always be depended on for close time especially if the clock is controlled with a well compensated pendulum.

We have no evidence or proof that any electricity exists in the human body to affect the timekeeping qualities of a watch. In all cases where complaints of that nature are heard the real trouble has been found to be poor workmanship on the watch, or that the owner uses the watch too roughly, winds it irregularly or expects too much from the grade watch he is wearing.

Explaining Strip Pallets

IP: I was told all cheap clocks have strip pallets. What kind of escapement does that mean and what does the strip pallet look like?

Answer: The name strip pallet is a shop term derived from the fact that the verge or pallet is made from a strip of steel stock that is of proper thickness and width. The strip is formed to desired angles and then hardened and polished ready for use. The strip pallets are found in all recoil escapements. You will find them in all our American mantel clocks employing short pendulums. The recoil escapement has proven itself the most practical for such clocks. In the case of longer pendulums such as for wall clocks we find the dead beat escapement. For that kind of escapement the pallet must be made from heavier stock in order to have a longer impulse face so that pallet is cut from solid stock, then hardened and polished and naturally is more expensive to produce.

Polishing Scratched Crystals

CAP: I get quite a few watches that have scratched crystals and in many cases my customers do not want to go to the expense of a new crystal. Is there any way I can repolish these scratched crystals?

Answer: If you mean a glass crystal it would not pay to attempt to resurface it as the time consumed would be more valuable to you than the crystal you are trying to resurface. However if you mean a nonbreakable crystal that has become dull or scratched you can, without much loss of time, resurface it like new. Use a cotton buff run at high speed and apply a fine grade of polishing compound with oil. The secret is to buff lightly so as not to burn the surface. This will remove the scratches. Then with a clean soft cotton buff a high polish is quickly obtained. But I repeat, do not apply any pressure when buffing as there is the danger of burning or buffing deep grooves into the soft surface of the material.

Finding Proper Cutter Width

WH: I want to cut a wheel of 80 teeth, and the primitive diameter of the wheel is 40 mm. Will you tell me how to determine the width of the cutter required for this job?

Answer: Divide primitive diameter by number of teeth, and the result will be the diametral pitch. Multiply the diametral pitch by 3.1416 to obtain the circular pitch; divide the circular pitch by 2, and the result will be the width of the cutter required for your job.

$$\frac{40}{80} = .5 \text{ diametral pitch}$$

$3.1416 \times .5 = 1.5708$, or circular pitch

$$\frac{1.5708}{2} = .7854 \text{ mm., or width of cutter}$$

Precious Metal Melting Points

BH: What is the difference in melting points between platinum, 18K gold, and silver?

Answer: The melting point for:
Platinum—1773° Centigrade
18K gold—995° Centigrade
Silver, fine—961° Centigrade
Sterling silver—893° Centigrade

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Water - resistant watches with 17 jewel INCABLOC shockproof, antimagnetic movements, luminous dials and hands. Beautifully finished case, handsomely strapped.

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● Chrome top/SB	$ 9.95	$15.95
● All Steel	11.75	18.25
● Yellow top/SB	13.50	19.95
Nurses	**Water Resist**	**Water-Res. Automatic**
● Chrome top/SB	$11.75	$18.25
● All steel	13.45	Not Avail.
● Yellow top/SB	14.75	21.75

'The Spaceman'—17-jewel Incabloc movement in the latest style chrome top/S.B. water-resistant case with enameled-numbered bezel. Futuristic dial with luminous dots and hands. S. Second hand. Handsomely strapped.

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'The Spacewoman' Same as above for Ladies, with yellow G. F. top S/B

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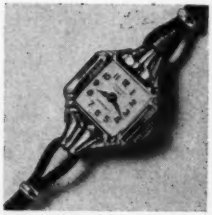
$10.45—17J 6x8 Font movement in a RGP/SB case — latest in case design—available in yellow, pink, or white — ask for No. M-46. Same in 14K. $12.45.



● Gents' All Steel Expansion Band.....$1.85
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Rubin & Co.

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Determining Clock Weight

JJP: I recently ran across an old Howard regulator clock with a long pendulum but the cord and weight are missing. How can I determine how heavy the weight must be to drive the clock? I cleaned it and everything seems to be in order.

Answer: E. Howard and Co. built several model regulator clocks, mostly eight-day. However, some were built to have a single cord to carry the weight and some had a double cord which called for two times the weight as required for the single cord. It usually requires about three pounds to drive with single cord and six pounds for double cord. However, your best bet is to suspend a small can onto the cord without the escapement showing any slide. Add about 10 per cent more weight, then the pendulum motion is increased to show the escape wheel tooth sliding slightly up on locking face of pallet. As a rule, these escapements were constructed to show a 3° pendulum arc. You will probably find an index scale attached to the back of clock case just below end of pendulum. With degrees indicated to the right and left of zero or center of scale, the pendulum is to swing 1½° either side of zero.

Rusting Out Stems and Screws

IS: I have saved a lot of winding crowns with a part of the stem or plug in them. I had in mind to save and use them again by removing the plug and I tried to drill out the plug. But I found the plugs too hard or my drills too soft. What information I seek is, will you suggest some easy way to remove the steel plugs from the winding crown?

Answer: Similar questions for removing broken stems and screws have appeared in this column. Assuming that you are a new reader, we will repeat the answer.

Make up a saturated solution of alum and warm water. Place parts in solution and keep solution warm for faster action. The time required to rust out a screw or stem naturally depends on how large the steel parts to be rusted out are. Or you can use a solution of 10 per cent sulphuric acid and 90 per cent water. This is effective for rusting out steel parts. Small bubbles will form as the action of the acid proceeds and occasionally a bubble will form in the screw hole preventing the acid to act. Eliminate the small air bubbles with a pointed brass wire. Sometimes a pink surface will appear on the plates. After being immersed in the alum or acid solution the discoloration or oxide of iron can be removed with a brush, using cream of tartar and water or baking soda, or a quick dip in a solution of cyanide. You will find that your jobber carries prepared rust-removing solutions that are very satisfactory. One of the late products on the market for screw removal solution is made by Rolindo Chemical Company, Lancaster, Penn.

Use of Fly Cutter

PKA: In one of your articles you mentioned to use a fly cutter. Will you explain what a fly cutter is and what it is used for?

Answer: The term "fly cutter" is applied to a milling cutter or tool which only has one cutting edge. Such cutters are used when there are only one or two pieces to be cut and are more easily made than with the multiple tooth cutter. The fly cutter is held secure in an arbor. It is mostly used for cutting brass wheels. The fly cutter is not satisfactory for cutting steel pinions. A round cutter is superior for steel work.

Hourly Pay

CPA: Do you know of any shop where the watchmaker is paid by the hour for his work?

Answer: I have heard of a few shops in Chicago that pay by the hour but am not aware of any fixed scale. It may be another way of the employer saying, "I will pay you so much per hour if you turn out a fixed amount of work per hour." This would amount to the same as piece work, only on piece work the workman would not be under contract to turn out a fixed amount. In other words, the pressure would not be so great. But if the watchmaker is called on to act as salesman as well as do watchwork between time, perhaps an hourly scale would be in order and fair.

Vacuum Packing Watches

HM: We have been toying with the idea of vacuum packing our slow moving inventory of jeweled lever watches in an effort to prevent the necessary cleaning of watches after they have been in stock for a period of six months or more. We would like to hear your reaction to this. Also, we would appreciate receiving any additional information you may have as to the problem of oil becoming thick or breaking down so that the cleaning of new watches after having been in stock for some time can be eliminated.

Answer: We know about food that is vacuum packed and that it preserves the food, or in other words does not let the food spoil. The idea of vacuum packing a watch may have some merits in the way of preserving the oil until the watch is put into service. Of course, the idea would have to be carried out to learn how the different oils would react to the vacuum treatment. It may be some oils would spread and run away and others might just curl up and dry out. At any rate, a vacuum packed watch should not rust, as all moisture would be removed and if the oil is not affected the watch would be fresh and ready for service regardless of how long it had been sealed in its container.

Old Elgin Key-Wind

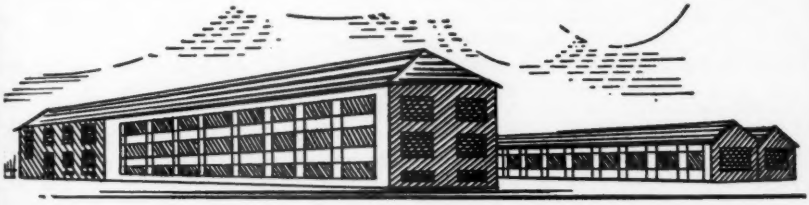
D.S.D.: I have an old Elgin key-wind watch, 18-size in a gold-filled case, open face, and the movement is numbered 142376. Can you tell its age?

Answer: From our records, your watch was made and left the Elgin National Watch Company approximately 1872.

Dating Old Elgin Watch

JB: I have a pocket watch and am very interested in knowing its approximate age. It is wound with a small key and stamped "Elgin National Watch Company, No. 1054115, Elgin, Illinois."

Answer: Referring to the Elgin watch you possess, records show that this watch left the Elgin Watch Company for service in 1882.



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One of the world's most successful advertising experts tells Jewelers how to build traffic and increase business

Four Steps For the Future

By Don Belding

(Editor's note: Don Belding, chairman of the executive committee of the international advertising firm Foote, Cone & Belding, analyzed the Jewelry-Watchmaking profession and sees great opportunities ahead in this business. More important, he tells how to take advantage of these opportunities. The following article is from a talk given by Mr. Belding at the national convention of the United Horological Association of America in Omaha, April 24, 1955.)

SOME TIME AGO Mrs. Belding and I visited the village of Chichen Itza on the Yucatan Peninsula in Mexico. Here we found an astronomical observatory, over 1000 years old, that would give credit to those in use today. At this observatory the high priests who controlled the daily life of every person made their observations in secret, ordered the time for the burning of the brush, the planting, the harvesting, and established the religious rites which accompanied these events — all hooked back to a single profession, *the keeping track of time.*

The keeping track of time appears to have been one of the *most important* professions in the daily lives of the entire human race since the dawn of history.

Prehistoric man must have soon noticed, as reason began to occupy his mind, that a stick placed in the ground exposed to the sun cast a varying shadow which rotated, contracted and extended.

Such a stick must have provided the means whereby prehistoric man arranged his meetings with others from afar and gauged the activities of his daily life.

From this it was a short step to the sun dial which divided out the arc of the shadow.

And from this came the mechanical water, candle and oil clocks and other devices to gauge subdivisions of the arc, both day and night, into what we know as hours.

Vital Profession

■ YOUR PROFESSION is so integrated into the daily life of mankind that it would be hard to find another service profession which is more important.

Thus, you belong to a profession of which you can be immensely proud.

It has been correctly said that, if it weren't for the watchmakers, our civilization would not be as advanced as it is, for the watchmaker has contributed to science and industry more than any other calling except, possibly, the chemist.

But, as you well know, your profession is often not appreciated, and certainly not appreciated as much as it should be.

Any preventive profession is like that.

It's like selling a preventive for a cold. When you feel fine you shun those things which might provide you good protection from catching a cold. But when you get a cold you will do almost anything to get rid of it.

It is easy enough to get customers when a watch has gone wrong and has to be fixed. The big problem is to get hold of the watch while there is still time to inspect *and* overhaul it *before* something happens to it.

I find that you number about 40,000 horologists, down somewhat in the past five years as members of your profession have yielded to the appeals of other precision types of work such as the great electronics and subminiaturization industries now starting to develop.

That means there is now one working horologist for every 4,000 people in America.

Of these 40,000 some 3,800, I understand, belong to this organization.

One out of every 12 people purchases a new watch each year. This would mean that for every working horologist about 333 new watches are sold each year.

From these figures it is easy to see that there is great potential for the working horologist.

While there are some 60 watchmaking schools about the country, I was amazed to learn that *only one* institution of higher learning had a watchmaking school.

Sales Declining

■ LAST YEAR, I am told, the retail jewelry business decreased 15 per cent from 1953 and watches, one of the normally stable items, decreased about 22 per cent, dollar-wise.

Now these four things—the drift of horologists to other industries, the lack of professional standing in the institutions of higher learning, the decline in the jewelry business and the decline in watch sales—are red lights that should cause us to pause and consider the future of this profession and what can be done to improve the position which it so richly deserves, both from tradition and service to the American people.

Let's approach these things one at a time.

Dignify Profession

■ FIRST, the professional training. While we all know that horology is a technical business, I see no reason why accredited universities would not advance the profession if competent instructors could be obtained at prices the universities could afford to pay.

The big problem seems to be instructors, because a professor can make more money in the trade than in a university.

To solve this, your industry might devise some kind of subsidy for your teachers so that it would be profitable for them to devote the rest of their lives teaching future horologists. This is basic to survival and must be considered in any long-range plan for your industry.

You should build rigid standards for anyone who achieves the distinction of a professional horologist and for anyone who enters this profession.

In this connection, I know of no test in industry that is more difficult or more complete than that used by the Swiss for apprentice watchmakers.

After a series of tests on all phases of watchmaking, the applicant is given a bar of metal and a cutting tool. He is left alone until he personally makes the tools to make a watch, then makes a watch of his own design and has it running within minimum tolerances.

If successful, he has arrived. He is an apprentice watchmaker.

I don't think you need go so far as the Swiss, but far enough to assure complete competency of the working members and the confidence of the public that your standards are high enough to guarantee complete satisfaction to the customer.

The immediate loss in volume is something much more serious, and I would now like to direct the balance of my time toward an analysis of this problem and, if possible, to give you a few ideas from my experience that might help to alleviate the decline.

I see that you have, as do other industries, a controversy going on concerning fair-trade laws. In addition, you have the government making it tough for Swiss imports.

But regardless of these internal factors, you must go ahead on an expanded basis to assure the volume and the profits which you so richly deserve. You must think positively, not negatively—and advance boldly. There is great truth in the old adage, "Boldly ventured is half won."

Jewelry Store Is Key

■ IN LOOKING OVER the recent Watch Inspection Time Contest winners' statements, I was impressed with this:

"The watch is the jewelry store's most staple item. It follows, then, that the servicing of same is more than an essential element in maintaining a profitable establishment."

and this

"The watchmaker can be made a magnet to bring customers to a jewelry store."

and this

"The Watchmaker must be a diplomat, a mechanic and a salesman—all rolled into one. His attitude and approach can be largely responsible for the success or failure of a jewelry store."

The key, of course, *is* the jewelry store, where sales of new watches, repair of watches, etc., account for a substantial percentage of the billion-and-a-half volume enjoyed by the 22,000-odd jewelry stores in America.

The Age of Selling

■ TO BE SUCCESSFUL these days we must first remember that this is an age of selling, of great competition—also of great changes in conventional methods of marketing and distribution. So any expected sales improvement of jewelry store volume must be approached from the standpoint of devices which recognize these new trends.

Let's now study the positive factors:

1. Everyone must have a watch—maybe two or three—and everyone wants them in proper and accurate running condition.

2. New jeweled-lever watches are being sold at the rate of 10,000,000 a year.

3. Repairs on watches run about $450 per month per horologist. How can the sale of watches be increased? How can the watch repair business be increased? To get the solution we must explore three factors.

Know Your Market

■ FIRST IS THE MARKET. Is our market increasing or decreasing?

We find that births now total four million a year—11,000 a day. This country has over 164,000,000 people and will have 180,000,000 by 1980. Our market is expanding rapidly.

Of the 41,202,000 families in this country, over half married within the last 13 years—new homes for new sales.

When we contrast the size of families with 1940 we find that second children have increased 91 per cent, third children 86 per cent, fourth children 61 per cent, fifth children 15 per cent. More children for children's watches.

Already those over 65 will number 15,500,000—equal to the entire population of Canada. Yes, the population growth shows that there is plenty of customer potential for watches and watch repair work in the years ahead.

Now how about income?

In 1939 there were 45,000,000 gainfully employed in America. The figure now is over 62,000,000.

People are earning more money than ever before. There are 10 times more of us in the $5,000 bracket than in 1941. And the average income has increased. The average middle-income family in 1940 earned $1,460. In 1952 it had risen to $3,981. It is higher today.

In 1940 the amount in savings accounts totaled 68½ billion. Today it is well over 250 billion.

Life insurance in force is up from 103 billion in 1940 to 310 billion today—increasing more than three times in 15 years.

Yes, there is plenty of money to buy watches and to spend for watch repairs, and there will be *more* in the years to come.

And what do we find on HOW the people are spending their money?

Well, as I mentioned, they are saving more but they are spending more, too. People are better fed—19 per cent more for milk; 33 per cent more for eggs; 2,000 per cent more for frozen fruits and juices. People are spending more for leisure and recreation—96 per cent more for books than 10 years ago; 140 per cent more for sports equipment; 129 per cent more for flowers; 263 per cent more for musical instruments, including radio, TV and phonographs; 76 per cent more for magazines and newspapers; 85 per cent more for theatre and opera. They have the money to buy *more* watches.

Now 50 per cent of the families take trips at least 10 days from home; 40,000,000 get paid vacations. One and one-third million people went to Europe last year.

The high cost of education is not stopping enrollment of our children—80 per cent more graduate from high school than in 1940; 55 per cent more students go on to college. We now have over 7,500,000 in colleges. Everyone must have a watch.

And in spite of what you hear about consumer debt, it's not bad in relation to savings. In 1940 the 33½ billion consumer debt represented one-half of all the savings. In 1953, my last figure of record, the 88 billion of consumer debt represented only one-third of savings. This is a very healthy picture.

So the market is expanding.

Your problem is to get your just share of it.

Reach Your Market

■ *SO the number two thing to consider is how you reach these people*—or, in other words, the media you use to bring the people into your jewelry store.

In this connection we must first look at where the people are.

A great change is taking place—74 per cent of the growth 1940 to 1950 has been in suburban areas. Since 1950 this has accelerated even more.

A lot of things have caused this dispersal.

Freeways are being built into the suburbs from almost every city.

More leisure time makes people want to own their own little homes. With more children, people want little places in the country.

And let's face it: People feel safer from atomic attack if they are in the country. At least they will have elbowroom, if necessary.

This means that the downtown stores are now confined principally within the limits of passing busses or trolley lines. We have proved this in a mass study in Los Angeles.

What I am saying, of course, applies to the major cities. In the smaller towns the shopping is still downtown.

But this is important in selecting media. Don't waste media which do not cover your marketing area.

To lick this, some dealers are using multiple listings in their advertising.

It works this way: Let's suppose you own a jewelry store in downtown Los Angeles. You want to run a watch-repair advertisement. So you line up watch-repair shops in the suburbs and you share the cost of the ad on the basis of audited circulation which the newspaper furnishes.

And you arrange it so that only one shop is listed for each suburb or marketing area.

I know of one group of retailers who are using this plan with great effect. It takes a little *extra* work, but you're going to have to *do* a little extra work if you expect to get *your* share of the consumer's dollar these days.

The point is: Be sure you know where your customers are, then use the most economical medium with which to reach them. If it's direct mail, then it's direct mail. You are not in a position to waste much money by scattering your shot. Be sure that the medium you use has a minimum of waste.

The second and concluding part of Mr. Belding's article will be presented in next month's A. H. & J.

By J. E. COLEMAN

CLOCKWISE and Otherwise

Pendulum Contest Winner

Mr. Coleman invites your questions. If your question requires a direct answer, please enclose a self-addressed, stamped envelope. It is impossible through correspondence to give valuations of antique time-pieces: questions of this nature cannot be answered accurately.

RESPONSE to our "What's Zit" in the April column was overwhelming, to put it mildly. Number one "under the wire" was Mr. Albert H. Osborne of "Ye Old Clock Shop," 669 Fulton Street, Elkhart, Indiana. At the inception of the idea of a little contest we had in mind only a first prize, but the reception of it brought so much comment from interested readers I decided to add on a "second" and it goes to Mr. David C. Olson of 510 North Fairview Street, Burbank, Calif. Accordingly, a copy of "It's About Time" by Maj. Paul M. Chamberlain has been posted to Mr. Osborne and a rare little English booklet titled "The Making of Clocks and Watches In Leicestershire and Rutland" by J. A. Daniel has been sent to Mr. Olson. Congratulations, fellows. And a hearty thanks to all who took the time and trouble to do a bit of calculating and wrote the column.

Albert Osborne, Elkhart, Ind., has correct answer.

Our solution: A close calculation of the train gives 1.235 seconds for the beat. If we take 39.1 inches for the length of one seconds pendulum and allow X for the length pendulum sought

$$\frac{x}{39.1} = \frac{(1.235)^2}{1^2} = \frac{61.525}{1}$$

$$x = 39.1 \times 1.525$$

$$= 59.6 \text{ inches.}$$

If this little "What's Zit" has provoked a little wrinkling of the grey matter along horological lines—and it well seems that it has—then it has served a good and useful purpose. Along this line, I can recommend chapter II Oscillatory Motion and chapter III The Pendulum from second edition of Dr. Rawling's book "The Science of Clocks and Watches" (# B-167 A.H. & J. book dept. $5.00 plus postage). These two chapters occupy but 50 of the book's 300 pages, but, it is the most complete and concise coverage of the subject to be found anywhere.

Naturally, we put the "bee" on the winners for a thumb-nail biog.

Mr. Osborne writes: "Born in Mishawaka, Indiana, February 11th, 1901. However, I attended school in Elkhart, Indiana. In 1917 I was apprenticed to machineshop and engineering training. In 1924 I was apprenticed to Mr. W. C. Brown, watchmaker of Elkhart. I now have my own shop; my equipment consists of the following: Elgin tool lathe; Logan screw-cutting lathe; Delta toolmaster surface grinder; drill presses and

all the miscellaneous tools and lathes required for fine machine work and watch repairing. I repair antique clocks also watches, cut gears, both metal and wood—I hold Indiana state license for watchmaking. Also do some indicator repair work for a local machine shop—married, have one son, one daughter and four grandchildren." His closing line says: "I really enjoyed taking part in the little 'What's Zit,' and would like to have more of them."

Mr. Olson writes: "Thank you for your letter notifying me of the results of the contest, I appreciate the award and know I will enjoy it very much.

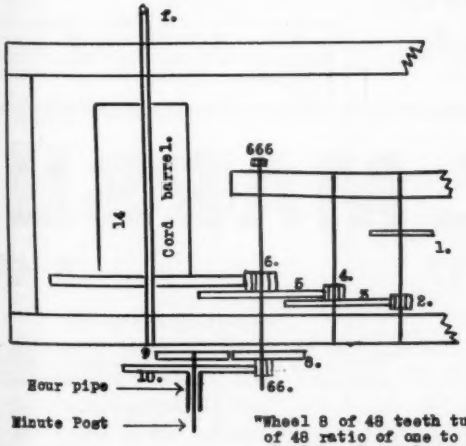
"I am sorry to be forced to admit that I am not a watchmaker by trade, but an aircraft engineer with a hobby of clocks and watches; I do only work upon my own pieces and sort of learned what little I know the 'hard way.' The first watch I ever took apart was an old verge quarter-repeater and naturally had quite a time with it. Success came at last and I then felt qualified to clean a quarter-chiming clock; this is now, I believe, at the bottom of the Burbank dump.

"I then obtained some books upon clocks and began studying both the historical and mechanical aspects of horology. I find it to be a rewarding hobby and think every watch and clock repairman should try to find time to thoroughly go thru some works upon horology, and books on the subject of old time clocks and watches. Even if he does not intend to work upon them he can then impart some of his knowledge to the general public; perhaps cause many fine old clocks and watches to be saved from ignorant destruction.

"I am now in the process of constructing a complicated clock. This will have an Invar pendulum, a four-legged Dennison gravity escapement, perpetual calendar (which I will adapt from an old E. N. Welch clock); mean time and solar time on concentric minute hands; apparent motion of the sun with time of sunrise and sunset; apparent motion of the moon with phases, age, and time of moonrise and moonset; the apparent motion of the sky with the horizon at Los Angeles, and an appropriate twenty-four-hour sidereal dial. Thirty-day, weight driven. Thanks for the booklet."

On the back he gives pencil sketch of dial arrangement, etc., and shows that the Dennison gravity escapement will show out front like the exposed Brocot—unfortunately a pencil drawing will not reproduce well for a magazine cut, so we are going to stick a "flag" upon his file and about the time the clock is completed hit him for couple of good photos of it plus additional description. It bids fair

PLATE 29.



From the specifications:

No. 1, Escape wheel 24 teeth,
2, pinion 10 leaves,
3, third wheel 76 teeth,
4, pinion 10 leaves,
5, second wheel 80 teeth,
6, pinion 12 leaves,
66, pinion 10 leaves,
8, dividing wheel 48 teeth,
9, minute wheel 48 teeth,
10 hour wheel 120 teeth.

Time train portion
Re-drawn from original sketch
same markings typed in, for
C.& O.

"Wheel 8 of 48 teeth turns minute wheel 9 of 48 ratio of one to one; this the second wheel No. 5 revolves exactly once per hour."

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233 Badgerow Building, 622 4th Street
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MARSHALL JEWELERS SUPPLY COMPANY
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to be a piece to delight the eye of every true horologist — under the sketch he makes pencil note: "I am not going to allow for the 26,000 year polar wobble."

We've a soft spot when it comes to "surveys" or "statistics" and so could not resist the temptation in that direction with so much material in hand—slightly better than 80 per cent of the answers ranged from 59.5 to 60 inches and thus we'd say that if all these men had been given the job of making a new pendulum for this clock more than 80 per cent of them would have made one that would have regulated to time without further alteration. One very noticeable thing was: not a single answer was below 59.5 inches. The greatest error submitted was 20 feet, 4⅜ths inches. Quite a number pointed out that the "specs" contained other unanswered questions; such as weight of the driving weight—length of run or fall.

The first would have to be by "trial & error," the latter would be very easy. The main wheel of 120 turning the hour arbor with a pinion of 12 would revolve the drum exactly once every ten hours—the 7½-inch drum allowing for cord for practical purposes could be called 8 inches, thus 8 times 3.1416 would reel off 25.13 inches of cord each rev. 192 hours for the eight-day run could be made an even 200 hours for easy calculation and then require 20 turns of the drum, or 41.9 feet of cord. Twenty turns of ½-inch rope would occupy slightly above 10 inches of "wind" upon the drum—he gives the o.a. length as 14¼ inches—with possibly two inches out at the head for the ratchet and main wheel and another inch at the end for the head, gives a clearance 11½ inches —so, it works out about right.

In all the replies, only one man suggested that he might use these "specs" to build a replica of this clock and you can bet that another "flag" went on the file; we'll want a photo of it. We never expected just one little old "What's Zit" would consume so much space but upon the other hand if it commands so much interest, it follows it can command comparable space.

New Books And Tools On The Market

Mr. Silvio A. Bedini, P. O. Box 424, Ridgefield, Conn., sends the column a notice of a volume soon to be published in Italy, titled: "Catalogo Descriptivo Della Collezione Delle Piane Di Petto E Da Tasca" (Descriptive catalogue of Delle Paine Collection of Old Watches.) By Dr. Parisi. Four color plates—12 plates black and white, to be bound in bright red cloth with gold lettering it will be manufactured in 500 numbered copies—price 6,000 lira ($10.00.)

• • •

Mr. B. Cholet, of Higgins Ink Co., Inc., sent down a 92-page volume, 8½ x 11, paper bound, titled "Technical Illustration" price $2.50. Principal portion of the text by Mr. Anthony D. Pyeatt and Mr. Byron G. Smith, both of Douglas Aircraft organization. Most of us do a bit of drawing once in a while and are familar with "Higgins" India inks and to those interested in brushing up upon their draftsmanship, especially three dimensional drawings and the "exploded" mechanical sketches so popular just now, this book is a must.

• • •

Mr. T. G. Englass, president of Englass Co., Inc., of 57 Shady Way, Rochester, N. Y. announces "The Englass Loupe." It retails for $4.50 and was designed for pattern makers, tool makers, watch repairmen, jewelers, engineers and designers. It is mounted on a swivel, thumb-screw clamp and can be attached to verniers, micrometers, slide rules, jewelers' lathe and any type of machine—in case of marring or breaking of the lens a replacement lens may be had for 75c.

The 22nd Annual Convention of The United Horological Association at Omaha, will be reported elsewhere, I am sure, and it isn't my purpose to intrude, for our Staff has always turned in a splendid job of reporting, but a few first-hand observations can not be interpreted as encroaching upon their job.

Convention Notes

The high point of every Convention for this writer is the "Workmanship & Skill Award Contest" and we can easily see the upward trend over meetings 20 and 15 years ago. This year, two awards went for "papers" and if my memory serves me correctly no papers were submitted until very recent years. There is no doubt about it, submitting papers indicate that today's horologist is going beyond manual skill with tools, etc., into history and research, a phase of the industry sadly neglected in the early years of this century. Let us hope that more theories will be advanced, research done and more history accurately recorded—in short; more papers submitted at coming Conventions.

Possibly it might be in the nature of "sticking one's neck out" to say that any great advancement in the mechanical skills was particularly noticeable; after all the mere making of a first-rate balance staff involves lots and lots of skill. It is safe to say that entries are becoming, shall we say more ambitious—I distinctly recall two winners as being rather "big" jobs. A splendid job of converting the regular watchmakers' lathe for screw cutting and gear cutting must have required many hours, and a neat little desk clock of unusal construction with detent escapement platformwise across its top would do credit to any man calling himself a horologist.

Another thought; I believe it would be well if the maker would attach a tag showing the number of hours required to finish the project, not that he should be limited in time, or that any degree of speed would enhance his chances to "win" —just because one of the most often heard remarks about these pieces was: "Wonder how long it took him?"

We'd like to ask a question of our readers. The detent escapement upon the little clock refered to was of the "spring" type, but the detent arm proper was "curved," roughly about 45 degrees and so far as we can recall, never saw a "curved" detent before. Therefore the question, have you ever noted a curved, spring detent?

And, while asking questions, here is

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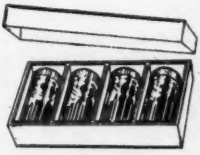

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another one. Have you ever seen a two-seconds pendulum (about fifteen feet) on a tower clock with true Graham grid-iron compensation the full length of the rod?

Between sessions, with James Hamilton and Wes Van Every, we snuck off to the Post Office and talked our way into the tower for a look-see at the tower clock—a splendid installation and rather large. We estimated the dials at fourteen feet diameter. Dennison three-legged gravity escapement and full Graham compensation on a two seconds pendulum—more rough guessing, there were three brass and four steel rods at least ⅝ths in diameter —that assembly alone must weigh upwards of a hundred pounds. A rather large cylindrical bob which we guessed between 200 and 250 pounds—all in all, the heaviest pendulum I've even seen. On the frame in raised letters when it was cast, we found "J. Barborka, Iowa City, No. 15." It irked me no little because that name wasn't familiar—somehow the bell just didn't ring. Then, on the way returning it came like a bolt out of the blue. Friend Floyd Robinson, clock-maker and collector of Rock Island, Ill., has one in his collection that Barborka built for the Rock Island Railroad. Checked and sure enough he has. Once on the "trail" we took off like a Tennessee fox hound and have now located three other tower clocks made by him, as well as learned that he made a complete watch and set it in a ring, a mantle clock to run a full year with one winding, etc. The $64 question right now is: does the No. 15 on the Omaha clock indicate it to be his fifteenth timepiece? Or his fifteenth tower clock? When we get the answer to that one, as well as some other data in prospect, possibly Editor Martin will let us do the Barborka story under one of the "Stray Bit" series. It goes without my saying any assistance will be greatly appreciated.

Over and above the splendid speakers, the good fellowship and the actual accomplishments for the entire Horological profession, it is heartening to note the young fellows coming about; they are definitely on the serious side and it is easy to see that they come to listen, to look and to learn. At the afternoon "Technical Panel" the questions definitely came from the youngsters, fully three-to-one. I can well remember when questions were hard to get. Whether the reason was men wanted to assume they knew it all or feared by asking a question they would be admitting there was something they did not know, is anybody's guess. Today's coming bench mechanic seems to say: "The heck with all that; here is an opportunity to learn something and I'm going to make the best of it." And C. & O. says: "More power to 'em."

J. & J.

Principles and Advice

Dear Mr. Coleman:

I find Clockwise and Otherwise very interesting and informative, and I never miss reading it from beginning to end. The patience, consideration and detail are impressive evidences of your fine character and ability. I am sure that if more of us earnestly endeavored to be as studious, capable, helpful and honest as you, our trade would rise to the respected position which it deserves.

My physical condition is such that I am not able to get about much, but I do as much reading and studying as time permits. It would be a source of much satisfaction if I were privileged to be located where I could have helpful contact with an able, experienced craftsman. My physician has advised me to locate permanently in a more favorable climate, and I am hoping I can locate where I can have association with craftsmen such as I have mentioned. Presently I am considerating the Carolinas, Florida and California. You may possibly have some suggestions, and if so, I should be greatly pleased to have them.

It would be helpful if you would suggest a few of the books which you consider to contain the most practical infor-

mation. I own a number, and take advantage of U.H.A.A. and local library services. One wishes there were more such as Gazeley's "Watch and Clockmaking and Repairing."

Occasionally I run into a problem such as making a new verge when one is missing from an old clock such as Seth Thomas, Plymouth Hollow. I have found no instructions, so I have usually proceeded to design and fashion the part so that it properly performs its function. Lacking the technical knowledge of the correct angles, I do much of the work by trial and error method. Of course this is the source of much of the joy and satisfaction in doing watch and clock work, and new and unusual problems present themselves every day. If a man lacks analytical ability and ingenuity, he had better choose another field of endeavor.

It has been a privilege to meet and visit with you, and I look forward to seeing you again in next month's Clockwise and Otherwise. Thank you very much.

WALTER R. BEARD

Linworth, Ohio

Dear Mr. Beard:

Basically there is nothing amiss in doing things the "trial and error" way. Many great things have been done by that method; there is a little economical angle that enters, because most of us have to complete the job as quickly as possible so we can complete another job quick so we can get a few groceries.

You definitely point out escapement angles when making a new clock verge. I think you'll find one of the very best explanations on this particular point in the 37 pages of Chapter VII of Ward L. Goodrich's "The Modern Clock" (A. H. & J. Book Department, $4.95).

I'm sure you've followed T. D. Wright's "Technical Horology" just completed in your A. H. & J., one of the best of the practical technical works. Under separate cover I'm sending the new horological book catalogue. Nothing can add more to any good book, or books, along any line than frank, prolonged discussion with one experienced in that line.

You mention changing location, etc. All the spots you mention are fine, and frankly, were I to be choosing, I'd be governed largely, if not altogether, by the opportunity to meet and associate with competent, experienced horologists.

J. E. C.

What Is Circular Escapement?

Dear Mr. Coleman:

I have a foreign-make clock for repair that has a circular escapement, but the roller table is missing and parts for this clock are not available. If there is any

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means of measurement to determine the correct position of the roller jewel so that the roller table can be made accordingly, would you be so kind as to give me this information at your earliest convenience?

W. N. ROERINK

Box 1331
San Antonio 5, Texas

Dear Mr. Roerink:

The strict interpretation of "circular escapement" is: "a lever escapement in which a circle struck from the pallet center passes through the centers of the lifting faces of both pallet jewels." The other detached lever escapement is known as "equi-distant locking escapement." In this one the locking faces of each pallet jewel is planted equally distant from the pallet center.

We do not think either of these specifications would enter into calculating the roller table as Saunier says with reference to the diameter of the roller table: "The diameter of the disc or roller varies directly with the size and weight of the balance."

Many questions directed to this column re a "circular escapement" we eventually learn refer to a "cylinder" escapement, and because we've seen it used that way so many times we are inclined to ask if you are so using it?

In all probability, this is a small clock. Perhaps it is French, and has a platform escapement—if so, you could easily detach the escapement and carefully pack it with tissue in a strong tin box, and ship to Clock Manor, 1901 East Colfax Avenue, Denver 6, Colorado, and mark for the attention of James Hamilton. Write him and ask for an estimate to put it in order; he can make whatever parts are necessary to correctly restore it.

J. E. C.

Movements for Floor Cases

Dear Mr. Coleman:

I have a customer who is going to make a small floor model electric chime clock case. I think it would probably be best to know what kind of an electric clock he can get, as to size of movement and so on. He would like the chime rods in a vertical position if there is such a clock movement available.

If such a thing is possible, can you furnish a sketch or two of a small floor model clock case, together with dimensions to help this man out in making his clock case? Thanking you in advance for your attention to this inquiry.

FRED W. HINDS

123 East Fifth Avenue
Amarillo, Texas

Dear Mr. Hinds:

Sorry, we have no sketches of small floor model clock cases. Ruben Kuempel of the Kuempel Chime Clock Company, 3611 Brunswick Avenue, Minneapolis 16, Minnesota, has for sale blueprints and sketches for making the regular size grandfather clock cases and we see no reason why one of these prints might not be scaled down to make the size case desired.

Mr. Kuempel also has movements and conducts a regular consultation service for builders of grandfather clocks. We are sending you an addressed card for your customer.

J. E. C.

Needs Repair on Seth Thomas

Dear Mr. Coleman:

I recently acquired an old clock with the following information on the clock paper:

1. Seth Thomas 8-day brass clock.

2. Made by Seth Thomas, Plymouth Hollow, Connecticut.

3. It is a shelf clock with a hexagonal opening at top and bottom, and a rectangular opening in the center with a gold painting of the world in the center and pictures of a R. R. engine, bales of cotton, and other items representing commerce on the glass. There are no columns on the sides. My guess is that this clock was made prior to 1853. There is a repair date of 1875 written on the clock. The veneer is in need of repair.

4. It is a weight-driven clock with count wheel striking train, and is in good running order.

Originally it was equipped with a calendar mechanism in the bottom as there are supports for such an item there. Any information you might be able to furnish about this clock will be appreciated. Do you know of any pictures? Could one obtain a calendar mechanism? Also, what is

the best method of repairing the veneer and refinishing it?

G. L. KNITTLE
208 West Washington Street, Room 1701
Chicago 6, Illinois

Dear Mr. Knittle:

Your date of 1853 could be accurate; it was certainly before 1866, because Plymouth Hollow was changed to Thomaston in that year. Many Seth Thomas calendar mechanisms were approximately the same size, and there is a possibility that some clock shop may have on hand such mechanisms which could be fitted in a restoration job which they have retained from old clocks.

We note your address of 208 West Washington Street, and recall that there is an excellent clock repair establishment right near you. Krause Brothers at 179 West Washington Street. If convenient, drop in and ask if they can supply calendar mechanism.

I fear we can't advise re veneering and finishing, as we have no experience in the cabinet-making line. If the clock is to have its fine old finish restored, and the missing veneer replaced so as not to show "patching," then it is a job for one skilled in that special line. Most clock repairmen are acquainted with cabinet makers and furniture refinishers in their neighborhood, as cases are often sent out for a refinish job after the movement has been removed. It might be better to have your case handled in this manner. However, if you are especially anxious to do it yourself, I suggest you look up and discuss it with some good cabinet maker near year.

J. E. C.

Dating Boston Co. Clock

Dear Mr. Coleman:

I have been a subscriber to the A.H.&J. magazine for several years, but never found the necessity of writing to you. My interest is watch repairing. While browsing through the junk shops recently I found a bargain in the type of a French clock which I will use on my TV set. The clock is not too old, but I'd like to know just how old within a close figure.

It's a Boston Clock Company product #3946 with balance wheel and jeweled

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lever escapement; French rack and snail striking escapement. The workmanship I can see is of the highest quality; rear plate is damaskeened; double mainspring barrel on one arbor.

I will greatly appreciate your reply.

AARON NEMOYTEN
527 Hendrix Street
Brooklyn 7, New York

Dear Mr. Nemoyten:

The Boston Clock Company grew out of the old Eastman Clock Company, and was active from 1888 to 1897 when the present Chelsea Clock Company took over —all were at Chelsea, Massachusetts.

There is no recorded data as to how they numbered their pieces, thus your No. 3946 cannot be checked on. They might have taken over the numbering of the old Eastman Company, and continued it, or might have started a system of their own. I can well think that they could have started with No. 1, and numbered consecutively on up, for I've seen a number of these, and they are easy to remember by both the strike and time spring barrels being on the same arbor. 4,000 clocks in nine years would roughly be about 110 clocks per week.

The Boston Clock Company produced the "Crane Year Clock," a 400-day type, patented by Aaron Crane of Caldwell, New Jersey.

J. E. C.

Old Home and Elgin watches

Dear Mr. Coleman:

I have two key-wind watches and I would like to know approximately how old they are. One of them was made by the Home Watch Company, Boston, Massachusetts, and the serial number is 737873.

The other watch is an Elgin, serial number 733720. If you can give me any information on these watches, I will be very happy as I haven't been able to find much here.

E. W. FERGUSON
1210 North Poplar
Wichita, Kansas

Dear Mr. Ferguson:

Brooks Palmer records that the Home Watch Company was used by the American Watch Company of Waltham, and that number 5190283 was made about 1868. Now we have no further clue to their numbering and how much later number 737873 was made is anybody's guess.

Elgin made watch number 700,000 about 1880 and number 800,000 about 1881, thus your number 733,720 must have come out between those dates.

J. E. C.

Antique Snelling Watch

Dear Mr. Coleman:

I am taking this opportunity to thank you for your very interesting and educational column in the American Horologist & Jeweler. I notice you give some information on old watches, so I am sending you two photos of a watch—one of case marks and movement. It has no jewels, no glass and no second hand, uses a fuzee chain and an escapement similar to the sketch I am also sending. Can you give me the age, who made it and if it is a collector's item?

D. E. OVERSTREET
Kiowa, Kansas

Dear Mr. Overstreet:

From the photo your watch is engraved "Snelling, Newton Bushell." Baillie lists a Snelling, no first name, at Newton Abbot, as having made an eighteenth century long-case clock.

Newton Abbot was a small town 20 miles south of Exter, and Newton Bushell is listed as a part of Newton Abbot. Apparently an engraver of the watch used "Bushell" spelled with two l's, but Baillie spells it "Bushel." What looks in the photo like the second *l* could be just a scroll or flourish, and again it could be truly two *l's*. At any rate, it's pretty sure the same and, as on the clock, your watch shows no first name. Evidently he used only "Snelling."

Your case shows a London hallmark for the year 1786. The watch could easily be called a collector's piece, either for its age, or its mechanical construction, and besides these features it has a beautifully made and engraved balance bridge or "watchcock," and some collectors buy them for that alone. In any instance just being a piece desired by collectors does not nec-

essarily mean that it would command a premium price.

If it is your desire to dispose of it, we suggest that you might insert a little ad in the "Mart," an auxiliary publication of the National Association of Watch and Clock Collectors, published by B. W. Brandt, Dutch Street, Montrose, New York, and sent to all their members.

J. E. C.

Escape Wheel for 400-Day

Dear Mr. Coleman:

I enjoy reading your articles very much and I glean many good things from same. I would like to know where I can buy an escape wheel for a 400-day clock of German make. Remington Rand put these on the market, I believe. Thanks very much.

R. DODD

Weslaco, Texas

Dear Mr. Dodd:

There are many makes or brands of 400-day clocks now in circulation, but we believe that Remington Rand imported only the Schatz. The Horolovar Company, Box 299, Bronxville 8, New York, stocks a complete line of parts for all 400-day clocks. I suggest that you copy all names and markings from both the dial and back plate of the clock you have, and send them together with the old wheel as a sample to be matched.

J. E. C.

Fogg Patent Waltham Watch

Dear Mr. Coleman:

My customer bought an 18-size Waltham watch, Fogg's patent, movement 426425, full-plate, double case 101016, with key wind. On the dial is "American Watch Co." Please, if possible, give me the age of the watch.

GEORGE W. PITTMAN

607 25th Street
Newport News, Virginia

Dear Mr. Pittman:

The Waltham factory operated under the name The American Watch Company, from 1859 to 1885. An accepted listing of approximately how their serial numbers ran, says that 178,200 to 427,600 was

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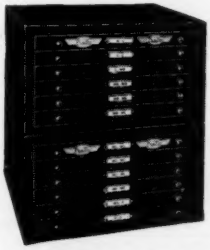

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used from 1865 to 1870. Your No. 426,425 must have come through in the latter half of 1869.

Mr. Charles W. Fogg was one of the leading mechanics at Waltham when they absorbed the Nashua Company. He was sent to Nashua to superintend the work there until another addition could be built at Waltham. Later, when the Nashua machinery was moved into this new addition, it was known as the Nashua department, and he continued to be superintendent over it.

Mr. Fogg was granted Patent No. 41,461 on February 2, 1864, covering a new type of regulator. This patent was assigned to the American Watch Company. The regulator had a pivoted lever with its bearings back near the base step of the balance cock. It vibrated between two adjustable points located where you now find the hairspring stud attached. He pinned his hairspring to the loose end of this lever and in operation, it worked between these stops very much as today's hairspring does between the regulator pins.

J. E. C.

Duplicating Old Clock Wheel

Dear Mr. Coleman:

I am in need of an escape wheel, diameter 40-mm. with 60 teeth for discontinued model made by Seth Thomas Clock Company for the Southern Calendar Clock Company, St. Louis, Missouri. Patent dates, December 28, 1875 and April 8, 1879.

Will you kindly furnish me the names of persons or manufacturing companies that have parts for old clocks, or who will make them for me. I tried Seth Thomas Company, but they will not furnish the escape wheel.

KIRT LUDWIG

Powhatan, Virginia

Dear Mr. Ludwig:

Send your old sample wheel for duplication to Hjalmar J. Olsen Company, 26 Templeton Parkway, Watertown, Massachusetts. They are manufacturing clockmakers equipped to handle any and all kinds of clock work. The Southern Calendar Clock Company, St. Louis, ceased business in September, 1889—66 years ago. Since it was a contract clock, we seriously doubt if Seth Thomas ever stocked repair parts for it, and if a few happened to be kicking around when the contract was terminated, chances are they were all gone by the turn of the century, and thus Southern Calendar material hasn't been available for about fifty years.

J. E. C.

Seeks Antiques Collector

Dear Mr. Coleman:

I was referred to you by the United States Time Corporation, formerly known as the Waterbury Watch and Clock Manufacturers. I have a Waterbury clock, and from the data I have, it is 89 years old, and I am looking for someone who has a hobby of collecting old timepieces, clocks and watches.

Any information you can give me in this respect will be appreciated.

WILLIAM B. WERTHER

407 West Maple Street
Compton, California

Dear Mr. Werther:

I suggest that you contact Percy H. Downing, an active member of the National Association of Watch and Clock Collectors at 1304 Aprilia Avenue, right there in Compton.

J. E. C.

Polishing Marble Case

Dear Mr. Coleman:

I am writing to ask if you can tell me how to improve the appearance of the case of a clock which has been repaired. This is one of those types that has a quite heavy case which I take to be imitation marble colored black. I notice the inside of the case is some kind of white plaster, but the outside closely resembles marble.

It would seem that the clock has been stored in a basement or someplace and water has been splashing onto the lower part of the case. Have recently renewed my subscription and am looking forward to resuming the enjoyment of reading your very valuable department in the A.H.&J.

D. P. RUSSELL

Third & Argyle
Port Alberni, B. C., Canada

Dear Mr. Russell:

Chances are the case in question is marble, and from what you say, it is going to have to have a re-polishing. Our experience with these prove that it is far better to remove the movement and turn the case over to a marble cutter (gravestone manufacturer) and have him do the job.

Many recipe books give methods for polishing marble. After all, the principal thing is "elbow action." Make a fine paste of beeswax and spirits of turpentine, clean the marble thoroughly to remove all dust, dirt and grease, apply a thin coat of this paste and polish with a heavy block of wood covered with a piece of felt from an old hat.

Professional marble finishers use a fine putty powder and felt. You can readily see that where the case has been subjected to prolonged exposure, etc., and requiring a great area to be restored, that the hand method would require a lot of time.

J. E. C.

Cooper watch

Dear Mr. Coleman:

I read your column in the A. H. & J. with much interest, and also find a lot of useful information in it. Keep up the good work. I would like some information for one of my customers concerning an old watch. Here is all the information I could get off the plate: It is key wind and set, detached lever, 13 jewels, No. 75851, and engraved on the plate is the name "T. F. Cooper—London."

RALPH HURLEY

Box 601
Sanford, North Carolina

Dear Mr. Hurley:

Thomas Edward Cooper was actively making watches in London between 1820 and 1840. He is listed as a maker of repute and it is said he supplied the American market.

The serial number of 75851 has no special meaning since there are scarcely any records of the individual systems of numberings. If you can make a sketch of the hallmarks in the case, or a pencil rubbing of same, we could identify the exact year from it.

J. E. C.

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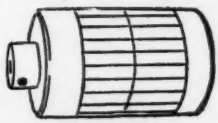

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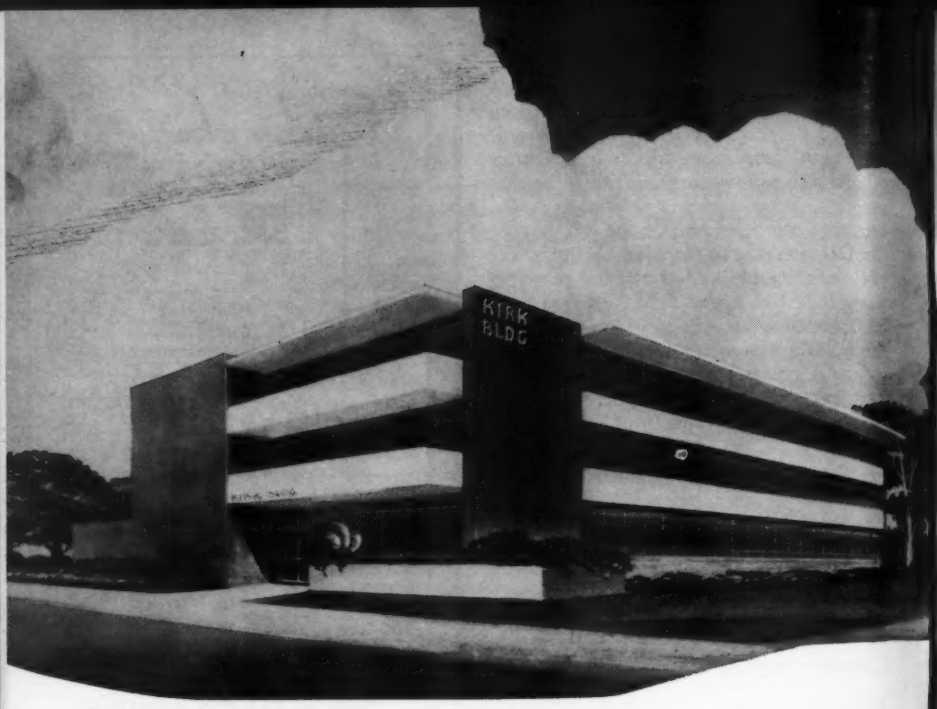


Kirk Dial ★ Dallas

■ KIRK DIAL, Dallas, known for over 25 years as one of America's most outstanding groups of craftsmen, skilled in the refinishing of watch dials, has completed moving its office and shops into the new Kirk Building, located at 4403 North Central Expressway, Dallas, where it now occupies the third floor. Rated the nation's most modern dial refinishing plant, Kirk Dial also has an impressive layout and specially designed facilities for watch crystal fitting and repairing of expansion bands and cigarette lighters.

Worthy of special note is the engineering of the plating room, where talented platers team their skill with the finest and most modern methods of the electroplating industry to give the finish of a watch dial

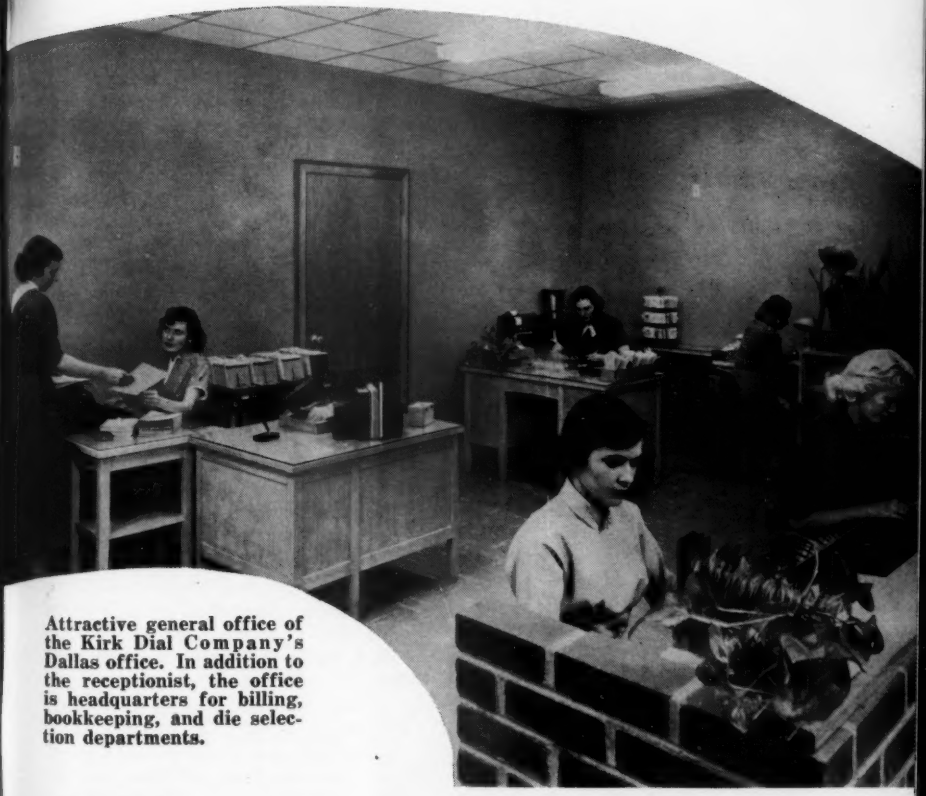
Kenneth B. Kirk, head of Kirk Dial Co., and Ruth R. Finley, manager, Kirk Dial, Dallas.

the color, depth, brilliance and individual "personality" plus the microscopic degree of perfection demanded in this unusual and intricate phase of the plating industry.

In designing the layout of this department, ample care and consideration were given for safe, healthful working conditions for all members of the plating staff. High and low pH wastes are disposed of through sealed mortar neutralizing drainage systems. The floors and floor drains are made of acid-alkaline resistant materials. Mechanical exhaust outlets at all plating units eliminate vapors and fumes. Reinforced plastic hoods and duct systems, custom manufactured by Weaver Engineering & Supply Company, instantaneously dispose of all fumes from heated acid baths.

"The move regrettably slowed the tempo of our operation for some time, but the patience of our many good customers during this period will be rewarded now with fast one-to-three-day service," Kenneth B. Kirk, head of the company, promised.

Managed by Ruth Finley, a skilled technician in her own right, the Dallas company serves a six-state area—Texas, New Mexico, Oklahoma, Arkansas, Louisiana, and Mississippi. The firm's 40 employees, all recognized craftsmen with years of ex-



Attractive general office of the Kirk Dial Company's Dallas office. In addition to the receptionist, the office is headquarters for billing, bookkeeping, and die selection departments.

Watch dial printing is a complicated process which requires expert know-how. Shown here, the watch dial printing section in the new Kirk Bldg.

Kirk Dial employees are master craftsmen. Here, a view of the plating and re-finishing room.

Final finishing of watch dials is done in this light, attractive room. Processes include hand coloring, retouching, and application of luminous material.

perience, serve as an extension of a jeweler's own staff, enabling him to expand his services.

When a jeweler or watchmaker suggests dial refinishing and new crystals to his customers, he realizes a genuine Plus in Profit because he has nothing invested in stock inventory. Nor does he have the added overhead of extra employees to handle the additional work.

Actually, it would be next to impossible for even the most skilled jeweler to handle this business himself, even with elaborate and costly facilities. For one thing, dial styles are constantly changing, and even though Kirk Dial has over 15,000 dies of different designs and shapes, an average of 100 new designs per month have to be added to their stock. Each die costs from $5.00 for an ordinary watch dial to about $20.00 for a telemeter. Thus, when Kirk Dial must make a new die for a job, the cost is several times more than the small charge to the jeweler.

Mr. Kirk opened the Dallas office and plant in 1929. Constant advertising, continued improvements in refinishing processes, and a never-ending effort to please customers have caused the company to grow at a remarkable pace, until Kirk Dial today has offices all over the United States and Canada and is the recognized leader in the dial refinishing industry. During World War II, Kirk Dial manufactured and refinished thousands of aircraft instrument dials.

To jewelers who would like to increase sales, Kirk Dial suggests contacting chairmen of special sports events with the idea of awarding watches with special name dials for prizes. A popular example would be dials which have been made for the Cotton Bowl football classic. General Motors has also used such awards in special salesmen's contests.

Many steps are involved in refinishing even an ordinary watch dial. All require the special skill of master craftsmen, in the refinishing and printing. With its modern, enlarged plant, Kirk Dial, Dallas, is in a position to render faster service and more precise workmanship. All of their good friends are cordially invited to pay them a visit when they are in Dallas. The welcome mat is always out.

ANNOUNCING!

The latest Fulton catalog of Finished Watch Crystals will be available on May 20th 1955

This new catalog we believe to be the finest and most complete in the industry —combining under one cover all of the latest types and styles of fancy watch crystals made in this country. We suggest that all bonafide users of fine watch crystals write to their local jobbers immediately for a copy or write direct to Fulton Watch Crystal Corporation, 121 Fulton Street, N. Y. 38, N. Y.

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Watchmakers' Contest

Winners of A.H.&J.'s Watchmakers' Contest for May:

First Prize: Arnold Case-Opening Wrench and Movement Holder to Ira D. Fickes, Jr., 622 Third St., Lancaster, Pa., for his "Re-Bushing Worn Stem Hole in Barrel Bridge," Contest Entry No. 66.

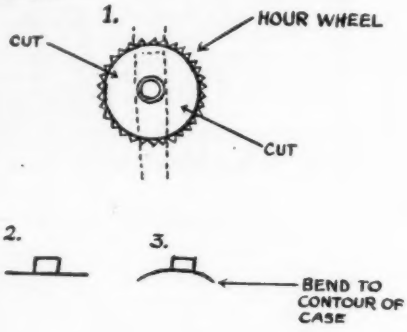
Second Prize: Algren patented waterproof rhodium plated watch crowns Asst. 901, and movement holder to Thomas P. Walsh, 205 Pixley Pl., Bridgeport, Conn., for his "Warmer For Crystal Cement and Sawdust," Contest Entry No. 65.

Third Prize: L. G. mainspring winder to A. C. Black, AEC, VF-154, CAG-15, c/o FPO, San Francisco, Calif., for his "Oiling Escape Wheel Teeth," Contest Entry No. 63.

DUST COVER FOR WATCH STEM

CONTEST ENTRY #67

If you need a dust cover for a watch stem, you can make one out of an old hour wheel by cutting it as indicated in the sketch.



"THE BRASS FINGER"

CONTEST ENTRY #68

A most simple, but valuable, tool of hard brass wire 6 inches long, 3-mm. in diameter. One end is tapered to a dull point, the other end tapered like a screwdriver blade. Burrs are raised near each end for finger grips by rolling between two files.

The pointed end of this tool is used for holding and pressing down watch plates. The other end is for holding down springs such as click and clutch lever springs. It will not scratch or leave pick marks like a tweezer will, and it eliminates fingerprints and rust from holding down plates and springs with fingers.

ADJUSTABLE WINDING TOOL

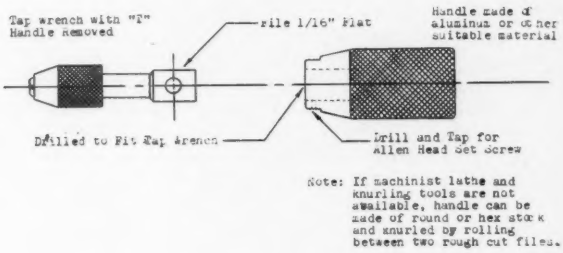
CONTEST ENTRY #69

A simple, efficient adjustable clock key for winding and unwinding clock springs can be made from a "T" handle tap wrench. In making this tool, I purchased a 1/16-inch to ¼-inch capacity tap wrench from which the "T" handle was removed, and a flat filed for a set screw. After these operations, a handle was machined from aluminum approximately 1 inch in diameter, drilled to fit the tap wrench, and then drilled and tapped for an Allen head set screw to hold the handle in place after assembly.

In using this wrench, it is tightened over the winding arbor and held firmly in one hand while the ratchet is released, slowly letting it slip through the hand. There is no danger of injury to either the clock or the clockmaker.

No dimensions are given on the drawing which is full scale, as different makes of tap wrenches vary in size.

Adjustable Clock Winding and Unwinding Tool

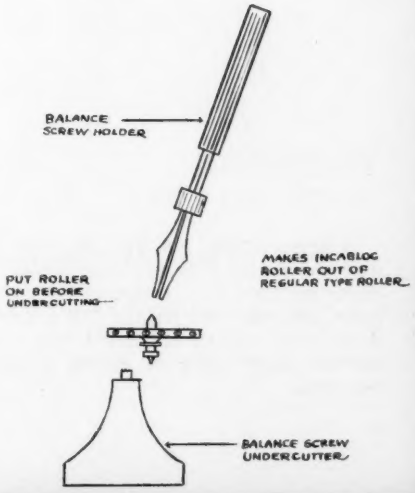

Tap wrench with "T" Handle Removed
File 1/16" Flat
Handle made of aluminum or other suitable material
Drilled to Fit Tap Wrench
Drill and Tap for Allen Head Set Screw

Note: If machinist lathe and knurling tools are not available, handle can be made of round or hex stock and knurled by rolling between two rough cut files.

ROLLER TABLE UNDERCUTTER

CONTEST ENTRY #70

Here is my entry for the Watchmakers' Contest which I call my roller table undercutter. I often have to replace a roller table of an Incabloc type, and find that the roller I have in stock is of the regular type, so I got to thinking why couldn't I use my balance screw undercutter, and just undercut it like I would a balance screw. I did and it works fine. I hope this helps fellow watchmakers as it did me.


BALANCE SCREW HOLDER
MAKES INCABLOC ROLLER OUT OF REGULAR TYPE ROLLER
PUT ROLLER ON BEFORE UNDERCUTTING
BALANCE SCREW UNDERCUTTER

Importance Of Guilds —And a New Tool

Watch Repairman and the OSCILLOSCOPE

By Carl H. Anderson

WE ARE WRITING THIS while on a speaking trip through Iowa. We have been making a series of talks on the Oscilloscope for the Horological Association of Iowa. So far we have addressed the Guilds in Des Moines, Red Oak, Sioux City, Fort Dodge, Waterloo, Cedar Rapids and Davenport. We will finish up in Burlington tomorrow night. We consider the trip to have been very successful as all of the meetings have been well attended and the interest shown in the use of the Oscilloscope in watch repairing has been exceptionally high. We do not believe we have addressed any meetings where the Boys have been more attentive to what was being said than has been the case in these meetings. Our talks to the various Iowa Guilds are the first of a new plan which has been adopted by the State Association.

The plan is to hold regional meetings such as these all over the state. At each of these regional meetings it is planned to have a speaker of national prominence. Due to the high interest shown in our speech at the State Convention in Des Moines last September we were selected to be the first speaker in this new plan to inaugurate it. We sincerely appreciate having been selected as the speaker to put the plan in operation. In passing we would like to say that Iowa is one of the best organized states in the United States. A couple of the guilds have not been as active as they could have been and it is the plan of the state officers not only to reactivate these guilds but also to form new guilds in a few sections of the state where they are needed.

We are firm believers in guilds and are always glad to do anything we can to help in organizing a new guild or to aid in the forming of programs for present guilds. It is indeed unfortunate that the guilds in so many sections of the United States have been allowed to lapse into a semi-active state. If there is anything we can do for any of these guilds, we are yours to command. What our profession needs is strong, really active guilds all over the country. There are so many things an active guild can do to help our profession that we will not attempt to enumerate any of them. We need guilds to keep up the interest in our profession and likewise to bring to the local Boys at the bench the new things which are constantly being brought out. Our experience in addressing various State Conventions and Guilds over the country is that a large percentage of the Boys at the bench need some new life injected into them. They need to learn new methods, new ideas and so on down the line.

New Tool Re-bushes In Less Than a Minute

■ IN THE PAST we have been privileged to bring to our readers' attention a few new things and items of interest to the man at the bench. We have previously mentioned there were several things we would like to tell you about but could not do so until released from our promise of secrecy. This month we are quite happy to be able to tell you about a new tool which will be of equal interest to

both watch and clock repairmen. This is one of the simplest, fool-proof gadgets we have ever seen. It is a combination hole closer and rebushing tool. Just to look at it, one might think it looks like a rather large (10 or 12 inch) pair of somewhat clumsy pliers, but when you see it work or use it yourself the first time you will very readily realize just how valuable a tool it really is.

Can you imagine rebushing a worn out watch or clock pinion hole in less than one minute? We didn't think it possible, but when we timed the operation we found it was completed in considerably less than one minute. Think how much time that will save. Another thing, the tool is self-centering so there is no danger in losing the correct depthing in either a watch or clock so that the pinion is out of upright when the job is done. How many times have you closed a hole or rebushed a worn bearing in a watch or a clock only to find when you had finished the job that you had lost your depthing and the wheel and the pinion did not roll freely due to the depthing being too shallow or too deep? There is no danger of such an error in using this new tool unless you are downright careless. Then, if you did get your depthing wrong, the wonderful thing about the tool is that you can do the job over and over as many times as is necessary.

We know all of you have had plenty of Felsa 690's and other automatic winding watches where the lower bearing on the intermediate automatic winding wheel had worn out so oval and the wheel was so far out of upright that the wheel rubbed on the lower plate so hard it prevented the automatic winding mechanism from working, so the watch ran down and stopped. You carefully checked the train and escapement of the watch and found nothing wrong, but your customer still complained the watch was a "stopper." Finally, when you went through the automatic winding mechanism very carefully you found the worn out hole. Upon further inspection you found the metal of the bridge in which the lower bearing is located to be quite thin. So thin in fact that you doubted the advisability of trying to close the hole in the usual manner. This left you no alternative other than to fit a new friction jewel for the bearing.

You probably experienced some difficulty in finding the center of the worn out hole, so that after it was reamed to fit a new friction train jewel and you frictioned in the new train jewel, the pinion was out of upright. If you did succeed in finding the center of the hole and frictioned in a new train jewel, you probably found the jewel was thicker than the plate so that if you pushed the jewel down deeper into the hole, the underneath face of the jewel rubbed the top of the barrel. Then if you pushed the jewel up, you found you did not have sufficient freedom or end shake in the pinion and when you tried to spin the wheel it was locked tight as a drum. What a quandary to be in. If the jewel was pushed down until the intermediate winding wheel pinion would spin freely, the jewel was so deep that it locked the barrel and the barrel would not turn. If the jewel was raised until the barrel was free it left no endshake in the pinion and the intermediate winding wheel was locked tight. The portion of the barrel bridge where this bearing is located is quite thin and under no circumstances can you put in a jewel which is even the tiniest little bit thicker than the plate.

You went through your stock of friction train jewels quite carefully and you were indeed fortunate if you found a jewel thin enough so both the barrel and the intermediate winding wheel were free. If you will turn the barrel bridge over and carefully inspect the underneath side you will find there is a recess in the plate exactly over the barrel to give the correct clearance for the barrel and the correct end shake to the barrel arbor. This makes the barrel bridge quite thin over the barrel and unfortunately the bearing is located in the thin part of the bridge directly over the barrel. This does leave you in quite a mess. You ordered more train jewels and the odds were very much against your receiving jewels which were thin enough to do the job properly.

One of the reasons why this bearing wears out so rapidly is the thinness of the plate where the bearing is located. If the

plate were thicker at this point, the length of the bearing would be greater and it would not wear out so quickly. There is a terrific side pressure of the pivot against the side of the hole in the bearing during winding, and the bearing being as thin as it is, it quite naturally wears very rapidly. We have had this bearing wear out in these watches that we had sold less than six months previously.

Wouldn't it be nice if you could punch out a blank from the thin place in the barrel bridge and use it for your new bearing? Well, that is exactly what this new tool does. While the manufacturer calls this new tool a "hole closing tool," we much prefer to call it a "rebushing tool" because that is exactly what it does. If punches out the worn hole and punches out a new blank from some other not used part of the plate which you use for the new bearing. The best part of it all is that it automatically centers the new blank so all you have to do is to drill a hole of the correct size in the new blank so the hole fits the pivot of the pinion. Since the new blank and the hole of the worn bearing were both punched out with the same punch from the same piece of metal, the new blank fits perfectly in the hole of the worn bearing. Also the new blank being made from the same plate, the new blank is the exact same thickness as where the worn out hole was punched out. All you do is to drop the new blank into the hole of the worn out bearing, tapping it down with your staking tool or staking tool hammer and it fits as tight as any friction jewel you ever put in.

Now as to the centering of the old worn out hole and the centering of the new blank so you do not change the depthing. This is entirely automatic. Unless you are extremely careless you will find when you put the new blank in the hole of the worn out bearing, you will automatically have both the correct end shake and depthing. Both of these things are accomplished by a self-centering punch which is almost exactly the same as the pump center punches of your friction jeweling tool.

On nearly all worn out bearings it is usually quite evident in which direction the hole is worn. In the Felsa 690 the lower bearing of the intermediate automatic winding wheel is nearly always worn in a radial direction away from the center wheel. By examining the worn out bearing with your loupe you will see the hole is worn out so much that it is quite elongated. If you cannot determine by looking at the hole in which direction the hole is worn, there is a very simple method of determining this. Assemble the automatic winding mechanism the same as if it were in satisfactory condition. With your tweezers grasp the intermediate winding wheel. You will find you can wiggle the wheel so that it almost or does touch the lower plate on the side nearest the center wheel. Then you can wiggle the wheel again until the wheel is perfectly horizontal. Naturally the wheel can not be out of upright if the watch is to wind itself automatically. Then by wiggling the wheel you can see in which direction the lower end of the pinion moves and that is the direction in which the bearing is worn.

Punching Out a New Blank With Tool

■ KNOWING in which direction the pinion moves to put the wheel out of horizontal or upright and in which direction you have to move the wheel back to make it horizontal or upright, you have determined the direction in which the bearing is worn. Then you disassemble the automatic winding mechanism and take off the barrel bridge. By examination of the worn hole with your loupe you immediately see the hole is elongated in the direction in which you were able to wiggle the wheel.

You know to which end of the hole you moved the pinion for the wheel to stand horizontal. This is the side of the hole which is not worn. When the wheel was out of horizontal allowing the wheel to rub the barrel bridge, the pinion was standing at an angle and the direction in which the pinion moved is the worn side of the hole.

The tool comes complete with a set of eight different sizes of pump center punches and dies of corresponding size.

Select the punch and die of the size you wish the new blank to be and put them in the tool. The centering pump center is spring mounted so the cone end of the centering pump extends well below the flat face of the punch. Place your barrel bridge between the punch and the die. Carefully squeeze down on the two plier handles until the centering pump of the punch just enters the worn hole. Sight with your loupe and see that the centering pump is resting against the *unworn* side of the hole and not against the worn side of the hole. Since the outside end of the centering pump is turned into a cone shape, as you apply a little more pressure to the plier handles it holds the pump center in the center part of the unworn side of the hole.

Make sure the barrel bridge does not move between the centering punch and the die and continue applying pressure to the plier handles until the flat faced end of the pump center punch firmly contacts the metal of the barrel bridge. Hold it rather tight and see if you can move the barrel bridge between the punch and the die. If the barrel bridge moves the slightest little bit you have lost your center or depthing and you will have to start all over. If the barrel bridge does not move, give a hard squeeze to the plier handles and you will punch a round blank out of the barrel bridge which contains the worn hole.

Now you have a hole in the barrel bridge which is several times the diameter of the old worn out hole. Next you move the pliers to some other place over the barrel bridge where the metal is of the same thickness as where you punched out the first hole. Make sure you do not move the pliers to any place on the barrel bridge where there is another bearing for some other wheel in the watch. With the barrel bridge between the pump center punch and the die, press down real hard on the plier handles and you punch out a second round blank with no hole in it. (This blank must not have any hole in it.) But when the pump center punch contacted the barrel bridge, it automatically centered the new blank the same as you punch a center in a piece of metal with the centering punch of your staking tool.

By examining the new blank you will find it is smooth on one side and on the other side there is a very small center. This center is in the exact center of the blank. Whenever you wish to drill a hole in a piece of metal you always tap the metal with a center punch to hold your drill in place so your hole will be drilled at the exact place you wish it to be. This new tool automatically takes care of centering the new blank.

• • •

Now all it is necessary to do is to drive the new blank down into the first hole where you punched out the original worn out pinion bearing. You will find your new blank will not drop into the hole, but you will have to drive it in with a flat faced punch from your staking tool. You merely drive the new blank into the barrel bridge until it is exactly flush with the bridge. By doing so you do not change

CORRECTION, PLEASE . . .

Our Correspondence Course is NOT devoted exclusively to Horological Oscillography. More than 50% of our Course is Watch Repair information which we do not believe has ever been published anywhere before.

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Carl H. Anderson, Founder

P. O. Box 578 Lexington, Kentucky

the end shake of the pinion, and after you have drilled a hole in the new blank your endshake of the pinion is exactly the same as it was originally.

Next you measure the pivot of the automatic winding wheel pinion and select a drill of the same or slightly smaller size and drill a hole in the new blank using the center the tool made in the new blank to hold your drill in the right place. We prefer to select a drill smaller than the pivot because it is seldom possible to drill two holes of the same exact size with the same drill. By drilling the hole too small for the pivot, we can carefully open the hole with a broach until we have just the exact pivot fit we desire. Then we stand the pinion up in the broached-out hole and see that the pinion does not tip more than five degrees from vertical.

One thing we particularly like about this tool is that when the job is done and we do not like it, or we find something wrong with it such as the wheel being out of upright, we can drive out the blank we put in, punch out a new blank, drill it and do the whole job over again. In fact we could do the job over as many times as desired because all we would have to do would be to drive out the faulty blank and replace it with a new blank.

Since the tool comes completely equipped with eight different size self-centering punches and dies to match, you can rebush anything from a worn pallet arbor hole in the smallest of ladies watches to the largest bearing in a clock. If you have many 7-jewel watches with worn out bearings, this tool will make it much easier for you to return the watch to your customer in much better condition than when you took it in for repair. We have worked on many 17-jewel watches where the lower center pinion bearing was not jeweled and the hole was so badly worn that the center pinion would almost fall through it. We would have very much liked to have had a tool like this when working on such watches.

We have never been a believer in hole closing because no matter how you close the hole, you must thin the metal some thereby making the length of the hole much shorter than it originally was. This causes the hole to wear out the second time in a much shorter period of time than it did the first time. Instead of hole closing we have always reamed out the worn hole and put in a new friction jewel. But now that a tool such as this is available, we can easily see how much easier and faster it is to rebush the hole.

We believe clock repairers will find this tool to be a real boon to them because today practically every eight-day clock which is brought to you for repair has very badly worn pivot holes and you simply must do something about it if the clock is to run and keep time, to say nothing about satisfying the customer. You can actually punch out the old worn hole, make the new blank, drive it in to the clock plate, drill and broach the new pivot hole and do the whole job in less than two minutes. We also believe clock repairers will use the tool on almost every clock they work on,

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Wendt-Squires, Inc., 3807 Harlem Rd., Buffalo 15, N. Y.

while on some clocks they will find it necessary to rebush every hole.

Probably the best thing about the tool hasn't as yet been told, and that is the price. We do not know whether or not the new price has been definitely determined but we have been assured it will be under $25.00 which is several times less than the price of any other rebushing tool we have ever seen. The tool was invented by the president of a company which builds to order custom-made clocks of all descriptions. They make an electric synchronous motor tower clock such as is used in city halls, court houses and other steeples which have 15-foot hands. The weight of all the birds you can get on the hands does not disturb the running of the clock in the least, which isn't true of many other clocks. They also manufacture master and slave clocks for hotels, buildings, factories, etc. A large part of their business is trade work and the making of lost or broken parts of clocks, including new plates, wheels and pinions, verges, etc., in fact any piece for any clock.

In making new wheels for very old wood wheel clocks they mill the new wheel out of bakelite so the clock is just as silent as it ever was and a bakelite wheel does not wear out as fast as a wooden one. They particularly specialize in watchmen's clocks and make them in a wide variety. They do not, however, make and market a regular line of clocks such as the regular clock manufacturers do. Everything they do in the clock line is special order work. They make any type of a new wheel or pinion. We were particularly interested in their making new verges where the old one had been broken or lost.

Ordinarily we are not interested in clocks and never mention them in this department, but in this case this tool can be used equally well by either a watch or clock repairer and for that reason we mentioned its use on clocks.

There are several other new things coming along and as soon as we get the "go ahead" we will tell you all about them.

Even by the greatest stretch of the imagination this tool isn't even remotely connected with Horological Oscillography, but we felt our readers would be interested in knowing about it, and therefore, this

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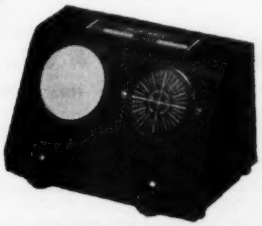

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article. We have complete information on many other items and ways of doing jobs on watches and could write about them if we felt there was sufficient interest on the part of the readers. Quite naturally we have no desire to bore you in the least by writing about things which are of interest to us, but which you are not interested in. In our many trips around the country addressing various State Associations and Guilds we have found so many watch repairmen who are not interested in anything new that we quite frequently hesitate to write about many things.

We believe it is quite unfortunate that so many watch repairmen feel they know all they need to know about watch repairing and therefore do not make the slightest effort to find out what is going on elsewhere. We believe everyone should belong to a good guild and that the officers of the guild should do everything in their power to bring to the guild's members every possible bit of information which would be of benefit to the man at the bench. Even when a guild does have an exceptionally good program, there are far too many watch repairmen who do not sufficiently arouse themselves from their lethargy to attend the meeting.

• • •

Why don't you become an active member of a guild and attend every meeting? How do you know you are not going to miss something which will save you a lot of time in your repair work and thereby make more money for you by doing your watch repairing better, quicker and easier? We really feel sorry for the fellow who does not feel he can learn anything. He most certainly is on a dead end street and will never get any further than he now is. Think it over. Are you in that category? Take the present series of meetings we are holding for the various guilds in the Horological Association of Iowa as an example. While the attendance has been good, it could have very easily been several times greater than it was. Make up your mind right now to attend your guild meetings, to take an active part in guild activities and try to put something into the guild instead of trying to see how much you can get out of it.

Jewelry Repairing

By R. ALLEN HARDY

Mr. Hardy invites your questions pertaining to jewelry repairing. Questions should be directed to Mr. Hardy, c/o The American Horologist & Jeweler, Box 7127, Capitol Hill Station, Denver 6, Colorado. Please enclose a self-addressed, stamped envelope.

Amazing New Techniques In Our Field

I AM CONSTANTLY AMAZED at the new techniques and designs being introduced in the jewelry field, techniques that will affect the watchmaker, engraver, jeweler or stone setter in spite of previous training in cut and dried methods of doing things. The watchmaker, for instance, may purchase mainsprings that are very simply pressed into barrels without the aid of winders. And now, a stone setter may set a stone by screwing it into the mounting. Sounds fantastic, but I saw it with my own eyes.

I happened to be calling on a customer in central Florida who knew I was interested in jewelry work of all kinds. He casually remarked that he was setting his own diamonds by screwing them in the mounting. Well—I like a gag as well as the next fellow but my remark of "Oh, sure" really brought out a mounting with adjustable claws not attached to the head proper, but to a screw arrangement located just under the head. The diamond is fitted into the adjustable claws which were then tightened by way of the screw. When secure, portions of the screw head are pressed into pre-formed grooves to prevent turning.

How could I question it. I saw him set a diamond right before my eyes without bending a claw or sinking a burr and without polishing the head. And it took him at least 45 seconds—I give up. What next?

? ? ?

Gold Testing Acids

Dear Mr. Hardy:

I enjoy your articles on jewelry repair very much. I hope that you will continue them.

My problem is: what acids are used to determine the karat of gold? If they are acids that I will have to mix myself, what do I mix and what are the proportions? My test set has three bottles, and I was under the impression that only one acid was used for testing.

THOMAS E. BULFER
206 E. Bland
Roswell, New Mexico

Dear Mr. Bulfer:

Nitric acid is used for testing gold. With a small file, make a nick on the article deep enough to penetrate plating and apply the acid. The following reaction will be observed: if gold plated over base metal, a bright green reaction will result; if gold plated over silver; a pinkish cream color will show; ten karat gold will show a slight reaction; over 10 karat shows little or no reaction. The acid is not diluted but is used just as it is purchased from the drug store.

To determine the karat of gold, first rub the article on the testing stone. Rub two or three needles of the estimated karat

near the mark made by the article. The acid will cause a reaction on all marks. The correct karat is determined when like reactions are found between the needle mark and the mark of the article. The reaction will be simultaneous. It should be very closely observed as the reaction is very slight and simply shows a shade of difference in color between 10K, 12K, 14K, etc.

Use nitric acid for 10K or less and aqua regia for anything above 10 karat.

As for the third bottle it could be used to contain chromic acid for testing silver.

R. A. H.

Diamond Setting Tools

Dear Mr. Hardy:

I have read your articles in the A.H.&J. and find them most interesting; also know of others who value and appreciate them.

I have been at the bench ten years and have done a lot of stone setting, but until I started reading your articles I didn't realize the many things that I did wrong and how I lost much costly time.

I am interested in knowing just what tools, by name, number and brand are the best to use for stone setting. I have trouble with beading tools, chipping and also milgrain tools.

Is the flexible machine much better than the watchmaker's lathe for use in stone setting? My big trouble is in pushing over the prong on 14K, 18K and platinum on a fishtail mounting for about a one-carat size diamond. Seems I have to struggle very hard to get them over.

If it could be done, I would like to know just how much push is needed. I am a fellow of about 200 pounds and I mean it takes a lot of push. I am sure that I am not going at it right. I would appreciate an answer on this. Also would like a copy of September issue, 1954, send C.O.D., please.

FRANK IREY

801 Witt St.
Jonesboro, Arkansas

Dear Mr. Irey:

I am gratified to know that my articles have helped you save valuable time at the bench. They are intended to do just that. I have always believed that jewelry work and diamond setting can be made easy for anyone showing an interest and a degree of mechanical aptitude. Logical methods are the answer, there are no so-called "tricks of the trade."

The principal tools needed for diamond setting are: a flexible shaft machine, a set of diamond setting burrs (the complete range of sizes) milgrain tool, flat gravers No. 36, No. 38, No. 40, onglette or "shad belly" graver, a set of jeweler's files, square and round steel for stock in making pushers, graver handles for mounting gravers and pushers, round gravers No. 51, No. 52 and No. 53. These may be purchased from most suppliers but I do not feel that I am in a position to specify brand names.

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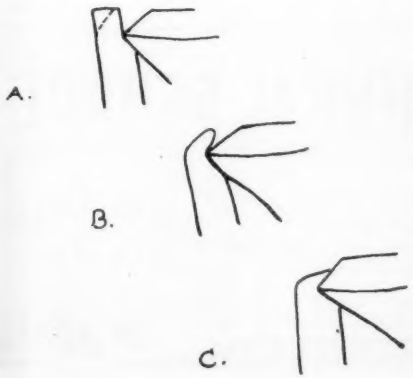
Brittle beading tools may be softened slightly by drawing the temper to a medium straw color. This will help prevent chipping. A beading block may be used to restore the shape of badly worn tips.

I would say the flexible shaft machine is a much handier tool to use for setting stones as well as for many other uses for the jeweler. I have used both and cannot say just why one method is better than the other unless it would be the time saved by bringing the tool to the work rather than the work to the tool.

There is no need to struggle at all in pushing over a prong, be it a ¼-carat or a 2-carat stone. The one principle to have in mind when setting a stone is this: file away just enough metal so that the prong will bend readily; leave as much metal as possible to insure long wear. There is a happy medium I can assure you. The bending of a prong tip, while it is a gradual procedure, should not be feared any more than polishing the finished job. If filed in the right place the first pressure of the pusher will start the bend, then occasional gradual filing as the bending proceeds will bring the tip of the prong absolutely flush with the diamond—no gaps. See *Figures A, B, & C.* I don't believe your 200 pounds will help a great deal on this operation.

The copy of the Sept. 1954 issue of the A.H.&J. has been sent to you as requested.

R. A. H.



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1212 Holland Bldg., St. Louis, Missouri

Welding Two Rings Together

Dear Mr. Hardy:

Thank you for your letter of Feb. 28th in answer to my question for the proper method of welding two rings together.

The answer you gave me was how to size rings, so I guess I didn't make my question clear.

I want to know how to weld a wedding and engagement ring together, instead of using ring clamps to hold them together while being worn.

I have done this some but my problem is how to hold them in position while doing the welding and also how to keep the original welds in the rings from opening up, and in case sizes have been added to the rings, how do you keep the added pieces from flying out?

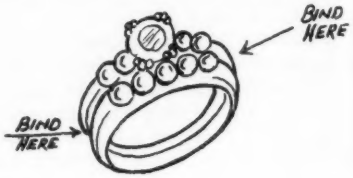
AL NEWELL

840 Main Street
Lewiston, Idaho

Dear Mr. Newell:

To do such a job where other solder joints are apt to open up would necessitate the use of a lower carat solder. For instance, the illustration shows diamond rings which would not be of a carat lower than 14K. By using low carat solder the melting point would be reached before the melting point of the 14K solder is reached. The flame would be more advisable here since the degree of heat may be more carefully approached.

To hold the rings together I would suggest ordinary steel binding wire tightly wrapped around the sections as shown in *Figure D.* There may be less risk of a shift of position if the set of rings is soldered on the asbestos pad rather than being held by soldering tweezers.



D.

Any job that has been previously sized will be risky, simply because the rings may be slightly bent. A bend creates tension and the joint may shift slightly even though it may not open. Actually you are more or less behind an 8-ball on a bent ring (previously sized) because an attempt to straighten it before sizing only creates further tension.

R. A. H.

Glassware Adhesive

Dear Mr. Hardy:

I am quite interested in repairing broken glassware, in reality, American cut glass or lead glass.

Is there a transparent glue both waterproof and heat resistant for this work?

HAL MIDDLETON

1298 Alexander Ave.
San Bernardino, Calif.

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Dear Mr. Middleton:

I believe you can secure a product to take care of your needs by writing to Bond Adhesives Company, Brooklyn 37, N. Y.

R. A. H.

How to Get a High Finish

Dear Mr. Hardy:

First, you can tell A.H.&J. I renewed my subscription because of your articles. The few I have read are just what a watch repairman wants to know.

Now—I am ALMOST satisfied with the jewelry repairs I do, shanks and prongs, etc., but—and a big "but"—I can't seem to get a professional-like finish. I mean, I can't seem to get a good, clean high polished, finished, new look.

It would be a great help if in one of your articles you would go into detail on the kind of motor you use, type of buff wheel, rouge, etc.

G. M. OSNATO

232 Broad Avenue
Palisades Park, N. J.

Dear Mr. Osnato:

I am very glad to know you like my articles. It is always satisfying to learn that someone has been helped by them.

I believe some of your trouble in not being able to secure a high finish on shanks and prongs may be due to a tripoli-charged rouge buff. Now, that sounds peculiar but it can happen very easily if tripoli is not removed from the articles after using that buff. You see, tripoli can collect in small corners and be carried over to the rouge buff thereby spoiling the buff for mirror-finishing. The rouge buff should never be contaminated with the slightest trace of tripoli. To really establish this point, try not using tripoli on your next shank job but using emery cones instead. After using the finest grit (No. 4/0 in emery paper, No. 1 in metallite cloth) try polishing with a new rouge buff lightly charged. This procedure will guarantee a mirror finish.

If polishing the head of a ring with a bristle brush, the same care concerning tripoli "carry-over" should be observed. Rouge buffs must be free of tripoli.

R. A. H.

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Quentin Reynolds interviews Charles H. Fetter (right), WatchMaster president.

industry News

TV Show Helps WatchMaster Users

■ CHARLES H. FETTER, president of American Time Products, Inc., manufacturers of the WatchMaster, was recently interviewed on a television show presented by author, commentator and correspondent, Quentin Reynolds.

A film following the interview depicted a young lady visiting a New York City jewelry store where her watch is tested on a WatchMaster, with close-ups of chart records to show the condition of the watch before and after repair. The film also showed the electronic method of watch testing, with the implied aim for the public to demand the protection made possible by the WatchMaster.

The original showing of the film was on NBC's New York Channel 4 at 5 p.m. on May 7th. Other showings are expected at a later date on approximately 80 stations throughout the country.

Burton M. Reid Sons Business Reorganized

■ BURTON M. REID SONS, INC., well known wholesale jewelers and watch material jobbers, have just announced a reorganization of their business effective as of April 1st. The reorganization has established J. Speed Reid as president, Hoyt M. Dobbs, Jr. as executive vice president and treasurer with Lester E. Collins vice president and general manager. Mrs. Caroline S. Dobbs was elected secretary of the company.

In discussing the reorganization, Mr. Collins said, "Our reorganization is strictly one of management only. Practically all of the persons identified with the new management have been with the company for many years. They are well known to our customers as well as to our company's various sources of supply.

"The company's financial position is sound and secure and with this new management we hope to enjoy growth and expansion.

"Our reorganization will immediately be reflected in important changes in our sales and merchandising policies. We expect to entirely confine our efforts to the sale and distribution of nationally known and recognized products of the highest quality. Nothing will be sold by us that cannot be fully guaranteed to give the highest degree of satisfaction. It is on this basis, and on this basis alone, that Burton M. Reid Sons, Inc., will solicit patronage from old as well as new customers."

Burton M. Reid Sons, Inc., was originally founded more than 42 years ago and during the intervening years has grown into one of the important wholesale jewelery and watch material distributing organizations in the Middle West. The firm travels 12 men who cover a large portion of the country.

New Fulton Catalog

■ FULTON WATCH CRYSTAL CORP. of New York has announced the publication of its new combined catalog, said to be the only catalog containing all styles and types of finished fancy watch crystals.

Bona fide users of watch crystals may write their jobbers for a copy, or may make requests directly to the Fulton Watch Crystal Corp., 121 Fulton St., N. Y. 38, N. Y.

Sandsteel Move Improves Services

■ SANDSTEEL, along with the other divisions of Sandvik Steel, Inc., has settled into new quarters in an 85,000 square foot plant in Fair Lawn, N. J.

According to James Pasman, Sandsteel vice president, the company will, through the physical integration of the several divisions, be in better shape than ever to offer better service during the busy summer season for watchmakers.

"Our move was planned," Pasman said, "to provide the best service possible. With facilities formerly situated in a number of different locations, the communication between divisions left something to be desired, and we could not enjoy the pooling of resources available now."

Sandsteel now provides right on the premises the Swedish steels and alloy steels that permit Sandsteel crosscurving.

Facilities at the new plant, all under one roof, will include rolling and slitting strip steel, making tools and dies, all the operations required in the manufacturing of springs, and extensive warehousing.

National Jewelry Week Successful Promotion

■ TELEGRAPHIC REPORTS from wholesalers the country over indicated that the first annual National Jewelry Week (April 22nd-28th) has made a great impression on the industry. The national Wholesale Jewelers Association, which sponsored the event, received many favorable comments even before the promotion was over.

In addition to the double-page spread in Life magazine and national press, radio, and TV publicity, other activity on a local level was widespread. In Cleveland retailers got behind the "week" with eight radio and television appearances. In Atlanta jewelers backed the promotion with a 16-page tabloid run in the "Atlanta Journal," lent opera-going socialites a million dollars' worth of rare gems, and gave local high schools silver tea services for their home economics classes. Although the over-all results were only fair, those who actually tied in reported excellent sales.

With the week still very recent history, NWJA members were already busy with suggestions for next year. Results from a follow-up questionnaire just received reveal a great deal of thoughtful criticism and recommendations for the future. Among the comments were: "Not bad for the first time—another try should have even better results;" "Let's start to work earlier next time and send out more frequent mailings to retailers;" "Let's get more participation from the retailers and use powerful color advertising."

Said one New York manufacturer summing it all up: "We believe the idea of National Jewelry Week is excellent. That was our reason for participating in it. We also believe that it requires a number of years to reap the full benefits of a promotion of this kind. What is required is a more promotional approach."

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Some of the above watches may require minor repair. Please feel free to return any you are unable to use for prompt refund or exchange. When ordering by movement identification, kindly indicate a second choice.

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Men's 17 jewel waterproofs, unstrapped, s/b AS1194 ..... $9.95 ea.
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Dial 2733 **SOUTHERN WATCH COMPANY** Gray 2, Georgia

Horolovar Price List

■ THE HOROLOVAR COMPANY has issued a new price list of 400-day clock parts, tools and other repair aids.

The new list contains more than twice as many items as the former listing. To receive a copy write Horolovar Co., Box 299, Bronxville 8, New York.

Watch Inspection Time Is Time for Teamwork

■ WATCH INSPECTION TIME gives jewelers and watchmakers a chance to coordinate their efforts to boost profits and dollar volume throughout the store, as well as in watch inspection and repair.

This year, the Seventh Annual Watch Inspection Time takes place September 8-17. Consumers will be urged to visit their local jewelers through a four-color advertisement by The Watchmakers of Switzerland. The ad, to appear in the Reader's Digest during the industry-wide promotion, will feature the famous Norman Rockwell painting of "The Watchmaker."

Special display and promotion material and newspaper advertising mats will be offered by The Watchmakers of Switzerland for jewelry stores to remind their communities about the necessity for periodic, expert watch inspection.

Indications are that all levels of the jewelry and horological industry are interested in tying in with the event. This will give jewelers even more outside promotional aid at one time, directed at creating store traffic for all merchandise categories.

It has been stated a strong selling-servicing team can increase sales and prestige in the stores because of the impact of such integration on the consumer. Watch Inspection Time last year proved this when more than 7,000 jeweler-watchmaker teams tied in with the promotion and reported excellent results.

Guild and Association News

Oklahoma Horological Assn. Convention

■ THE 1955 annual convention of the Oklahoma Horological Association, held last March 20 at the Skirvin Hotel in Oklahoma City, was one of the best attended gatherings in several years, according to word received from Secretary Bill D. Collins.

Shown in the photo at left below is Joe C. Scott, president of Bankers Security Life Insurance Co. in Oklahoma City, re-

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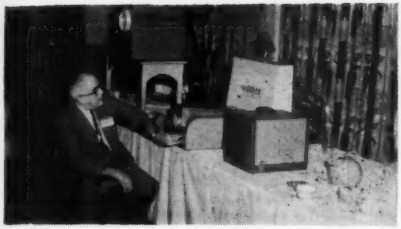

ceiving a plaque during the convention from President Sam G. Clements. Seated is Vice President J. E. Burris. The award was made to Mr. Scott in recognition of services rendered to the Association.

The other photo (above) shows Carl H. Anderson of Lexington, Ky., who presented a program on horological oscillography to the convention assembly.

New Jersey Watchmakers View Swiss Films

■ At a regular monthly meeting, held May 10 at the Irvington House in Irvington, N. J., the Watchmakers Association of New Jersey highlighted the program with three sound films on the subject of modern merchandising to increase store profits. The films were supplied by the Watchmakers of Switzerland Information Center. Also on the program was Milton Jasanoff, representative of Jacques Kreisler Mfg. Corp.

Michigan Horological Assn.

■ The 1955 convention of the Michigan Horological Association was held May 22 at the Hayes Hotel in Jackson, Mich. The featured speakers on the program were Carl Anderson of the Institute of Horological Oscillography, Ray Soucie of Elgin Watchmakers College, and Jack Marshall of C. & E. Marshall Co.

Illinois Assn. Meeting

■ On May 17, in Chicago, the Illinois Watchmakers Association devoted its meeting to studying the newest developments in automatic wrist watches. A round table discussion was held to consider the variety of winding mechanisms found in movements with from 17 to 30 jewels.

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